THE ZOOLOGIST.

THIRD SERIES.

VOL. V.] MAY, 1881. [No. 53.

THE PAST AND PRESENT DISTRIBUTION OF SOME OF THE RARER ANIMALS OF SCOTLAND.*

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III. THE POLECAT.

THE same causes which have influenced the decrease of the Marten seem to have operated in the case of the Polecat. Rabbit-trapping has proved fatal to it; for, whilst the increase of rabbits has provided it with an abundant supply of food, it has been the indirect means (through the agency of steel-traps) of causing its decrease.

Inland localities in the Highlands comparatively unstocked with rabbits have been gradually deserted by Polecats, which, drawing down towards the sandy barrens along shore where rabbits abounded, became an easy prey. Man, in order to rid himself of the "ubiquitous bunny," for sport or profit, set to work to devise means for its destruction. Steel-traps came generally into use, and the rapid disappearance of the Polecat was the result. The animal still exists, however, in some numbers in sea-shore localities; but careful inquiries have elicited the fact that this is only the case where rabbits do *not* abound, and are *not* systematically trapped, and where Polecats consequently are obliged to subsist on other kinds of food. It is amongst rugged deeply-indented shore-lines, where the area to be covered by vermin-trappers is greater than can be easily undertaken, that they are chiefly to be met with. In other words, these coast-lines afford the same means of replenishing the stock of Polecats as the deer-forests do in replenishing and saving from extinction the Wild Cat and the Marten. Some years ago one might have said, "You will find the Polecat most plentiful amongst the 'links,' or sandy downs, where they go to live on the rabbits." Of late years one would say, "Polecats have become very scarce, *especially amongst the sandy downs.*"*

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* Continued from p. 90.

No returns from any of the following counties having reached me, I should be obliged to anyone who will assist me to fill up these blanks:—Selkirk, Peebles, Lanark, Rosshire, Cromarty, and Caithness. I should be grateful also for any further statistics not contained in the following notes, as well as for any correction of errors.

Berwickshire.—In this county, as indeed generally throughout the south of Scotland, the Polecat was very abundant. They frequented the Peasedean Woods in considerable numbers, but Mr. Hardy informs me that he has not seen one "nailed up" for a long time. When I was at Grants-House, in July, 1880, the driver who took me over to Abbey St. Bathans, where I was going to fish the Whitadder, told me that he remembered one being killed there several years ago, but could not recollect the exact date. Mr. J. Hardy has kindly sent me the following data from Berwickshire:—"One killed near West Morriston forty-five years ago (say 1835). Another killed at Mellerstein House twenty-three years ago (say 1857), now stuffed in the House. One killed near Marchmont long ago (?). One seen at Threeburn Ford, parish of Chamelkirk, four or five years ago (say 1877 or 1876). A "Foumart" seen on Edington Braes, on the Whitadder, some thirty years ago (say 1850). Forty years ago (say 1840) there were numbers at Thirlstane Castle. One was seen in the summer of 1880, when my informant was fishing near Linhope on the Breamish (southern base of the Cheviots, Northumberland). One caught by the gamekeeper at Langton, near Dunse, fourteen years ago (say 1866). Not known now in the Gordon district. The last Polecat caught near Chirnside, near Blaneme, parish of Buncle, about forty years ago (say 1840). Once plentiful in Dowlaw Deane, near Fastcastle, and believed to be not yet extirpated. No Polecat trapped or killed on the Dunglass Estate (which includes Peasedean, Oldcambus, Dowlaw, &c.) during the present gamekeeper's time, and he has been in the situation thirty years (say since 1850). My recollection of them goes back to 1830 at least." Could such exact statistics as the above be obtained from every county in Scotland, our history of the Polecat would indeed be very complete.

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* It is curious, however, that in East Cumberland, where the Marten appears not uncommon, the Polecat seems to be almost exterminated, none having been seen for a number of years, as I am informed by Mr. Parkin.

Roxburgh.—In the same way it has become scarcer in Roxburgh, and people speak of their experiences of the animal as dating pretty far back. Thus Mr. Smail, "many years ago," found an abode of a Polecat in a dyke near the Doorpool Rookery. "It was shaped," he writes, "like a flattish nest in the centre of the old 'dry-stane' wall, the nest or den being made of grass." It contained one young one, but the adults were not to be found. They escaped by moving along the holes in the old wall. At a meeting of the Berwickshire Naturalists' Field Club, in 1880, at Gilsland, Naworth, and Lowercost, Mr. James Hardy discovered the remains (feet and tail) of a Polecat nailed to the door of the Vicarage at Lowercost, in Cumberland. At the time this led to a story by Mr. Turnbull, postmaster at Lilliesleaf, Roxburghshire, of his having seen a Polecat at Riddell, near that place. About twenty-five years ago (say 1855) a number of Polecats were killed near Kelso, but Mr. Brotherstone, of Kelso, seems inclined to put their extinction at an earlier date by five years (say 1850). In 1878 Mr. Turnbull, of Lilliesleaf, saw a Polecat run down and kill a rabbit in a field near Riddell, on the River Ale, at which locality a rabbit-catcher, still alive, informed Mr. Hardy, of Old Cambus, that he used to kill many when a boy. In the Jed Valley it is now not so frequent as formerly, principally owing to the trapping of rabbits. The last seen by my correspondent (Mr. Yair) was got at Langlee, near Jedburgh, about twenty-three years ago (say 1857). In Liddesdale one was caught in the winter of 1879-80.

Dumfries.—At one time the skins were sold at the Dumfries fairs in considerable numbers, but Dr. Grierson has not heard of one being taken for at least fifteen years (say since 1865). There are some fine specimens in his museum at Thornhill, all obtained more than fifteen years ago (say prior to 1865). The last specimen remembered by Sir Alexander Jardine, Bart., as he informed me, was probably about 1840. About 1853, however, Mr. Nichol Kerr, at that time keeper in that county, considered the Polecat to be not uncommon; he killed one that year.

Kirkcudbright.—The "Foumart" was once a common species in the Stewartry, but Mr. Service is afraid it is now extinct, or practically so. A few may yet remain in the wilder districts. In the eastern part of the Stewartry none have been heard of for a very long time. About thirteen years ago Mr. Lennon witnessed the chase of a hare by a Foumart. Both, when they passed him, appeared to be very much fatigued, the hare, especially, "staggering like a drunken man." This would be about 1867. Three years before (1864) Mr. Lennon stuffed one which was killed at Mountain Hall, on the Dumfriesshire side of the Nith. These are the last Foumarts Mr. Service can hear of in the vicinity of Dumfries. Mr. Hastings received two from Kirkennan, near Dalbeattie, about eleven years ago, and believes they are all but extinct in the south-west of Scotland, and nearly all accounts agree that "the rapid extinction of the Foumarts has been caused, as already indicated, by rabbit trapping," although due more to accident than to design on the part of gamekeepers and rabbit-trappers. It is seven years since a Foumart has been seen on Arbigland (Col. Blackett's), and they are considered to be quite extinct all through the county, except possibly on the high rough country in the north-west. In the parish of Kelton, in central Kirkcudbrightshire, the last Foumarts were seen on the estate of Dildawn about twenty-five years ago (say 1856), when a nest of young ones was destroyed. Mr. Bruce never heard of a Foumart on Slogarie, a circumstance which Mr. Service considers curious, for the ground is rough enough to afford excellent shelter for them. In February, 1881, Mr. Service was informed that a Foumart had been killed in Maryfield of Terregles, the next parish to Troqueer, early in December, 1880, where a valuable breed of ducks belonging to the farmer had been sadly thinned by its depredations, and a trap set in the evening secured the Foumart the next morning, not, however, before it had killed two more ducks. The dead ducks were found to have the brains neatly picked out. Mr. Service adds, "Probably the last of its race hereabouts."

Ayrshire.—As long ago as 1839, Thompson ('Fauna of Ireland,' ed. 1856, vol. iv., p. 9) saw several on the 5th September, which were taken at Ballantrae, in the south of Ayrshire, and in 1841 was credibly informed that these were killed in the neighbourhood of Loch Cor. At Culzean they are considered almost extinct now (1880), though occasionally one is caught by the keepers.

Lanarkshire.—The late Mr. E. R. Alston had not heard of a Polecat in this county for at least twenty years.

Haddingtonshire.—Dr. Crombie, of North Berwick, informs me that the last he heard of was shot about a mile from North Berwick, about twenty years ago (say 1860).

Edinburgh.—In Midlothian the only Polecats of which I have record are—one obtained on the farm of Tala Hill, and one seen some years ago at Crosswood Hill, as I am informed by Mr. Charles Cook. Mr. James Haldane remembers seeing one at Edmonstone, near Liberton, about twenty-five years ago, which was afterwards trapped by the keepers.

Linlithgow.—At Champ-fleurie two Polecats were killed in 1847 by David Carr, and none have been seen there since. The same man killed nine between 1838 and 1845 at Lochcote in the same county.

Stirling and Dumbarton.—In 1877 Mr. James Lumsden recorded the species as "quite extinct now, except by name." Mr. Colquhoun tells me they were at one time so plentiful that they might be caught at almost any time. He considers that since the reclamation of waste land "Foumarts" have become scarcer; but in this alone, I think, we can hardly look for the cause, for they are becoming scarce even in the deer-forests, and in some localities prefer cultivated to waste lands. Fifty-five years ago (say 1825) Polecats could not have been very common in Stirlingshire, for people even at that time were known to go a considerable distance to see one when obtained. Drummond, who was gamekeeper at Dunipace in my grandfather's time, occasionally trapped a few. Rabbits are said to have been introduced to the East of Stirlingshire about 1825, or between that time and 1830, by the fox-hunters, to afford food for the foxes. I do not remember hearing of any Polecats being obtained since that time; but an old mole-catcher told me of his having seen several on Gallowmuir about twenty years ago. Mr. Nichol Kerr, at Killearn, says they are extinct in that district of Stirlingshire, and he has not heard of one being killed for the last twenty years. About thirty years ago (say 1850), when the present gamekeeper at Blairdrummond, in the south-west of Perthshire, was keeper at Sauchie, he trapped a few Polecats, but they were not very abundant. The latest I have record of is one which Mr. James Stirling, of Garden, heard of near that place during the winter of 1879-80.

Kinross.—The earliest record I have for this county refers to one seen at Turfhills by Mr. H. Henderson about thirty-five years ago, say 1845. Even the memory of it has almost died out. Mr. Alexander Michie says, "The last, twenty years ago, on the moss on Scotland-well."

Fife.—Falkland Woods, in Fife, seem to retain conditions favourable to the residence of the Polecat. No doubt, in rocky, rugged, stony ground frequented by rabbits, trappers cannot use their steel-traps with such effect, or so numerously, and thus doubtless many inlets and outlets are left unguarded, by which the Polecat escapes the comparatively few traps which are set, whilst at the same time the food-supply remains abundant. About thirty-five years ago, when the Falkland Woods were inhabited by Polecats, Mr. Gulland remembers seeing one about in the Barn-yard Park at Falkland, which ran the gauntlet amongst a number of reapers and escaped. In 1880 one was often seen in the grounds. "When chased it took refuge in the thick ivy of the palace walls. The keeper tried to trap it, without success." None have been seen for twenty years (say since 1860) by the keeper at Lathirsk. At Lawhill the last Foumart was obtained by the old gamekeeper about fourteen years ago (say 1866). Mr. Charles Harvie, who is my informant in this case, saw a "black one in an old wood on the east sea-coast cliff twenty-four years ago" (say 1856). It is probably extinct long ago in East Fife. Locally termed "foumaret."

Perthshire.—Seems to afford refuge to some of our rarer animals longer than other counties farther south, or equally so, or, it may be, the number of observers is greater, and therefore its Natural History is being more fully worked out. In the south of the county it is, however, very rare. None have been obtained for the past twenty years (say since 1860) in any part of the Allan Valley, between Perth and Stirling. But at Leny, near Callander, one was trapped in 1858, and one previously in 1855. According to Col. Drummond Hay, our best authority for that district, they were common in the Carse of Gowrie about 1820 to 1824, but are now extinct and have been so for many years. At Duplin they have been extinct for at least twenty-five years, say since 1855.

At Doune, Mr. Anderson writes, "In all my trapping experiences I have only captured four. About thirty years ago (say 1850) I caught one on Lord Moray's estate above Doune. On Balquhidder Mr. W. Dewar killed Polecats twenty-five years ago (say 1855). It was exterminated in Glen Queich, above Cumbree, thirty years ago (say 1850). I have said that the Polecat has long been extinct in the valley of the Allan between Perth and Stirling, but upon the slopes of the Ochils facing the north it has lingered somewhat longer. None have been observed at Cloanden, near Auchiterarder since Mr. H. Haldane purchased the property, some twenty-five years ago (say 1855), but at Kincardine, about three miles from Cloanden, one was killed ten years ago (say 1870). This is the last known to have occurred in the district, where formerly it used to be common. At Balquhidder I have said they were killed about twenty-five years ago, but I have a much more recent date to notice. In 1880 Mr. W. D. Duncan, the lessee of the Edinchip shootings of Sir Malcolm Macgregor, Bart., saw a fine Polecat close upon the March with Suie; and previous to this Mr. John Dickson, co-lessee of the same shootings, shot another about the same place. This was in August, 1880. The gamekeeper at Edinchip, who was previously keeper on Suie, told me afterwards that he had not seen one in that neighbourhood for twelve years (say since 1868). Edinchip is at the head of Loch Earn. About twenty years ago two were trapped in Glen Artney deer-forest, and this informant says, "none have been got hereabouts since then." Farther north one was trapped on Ballechin Hill about thirty years ago, by Mr. Murray, gamekeeper. They inhabited the east side of Drummond Hill in 1835. At Killin Mr. Duncan Dewar got a male and female in 1858, the last obtained around Loch Tay. One of these Mr. Dewar carried home alive in his handkerchief, but it was so offensive that he could not keep it.

Argyllshire.—In this county it is not quite so scarce yet. In the Loch Awe district, however, it has been quite extinct for upwards of twenty years, say since 1860. Farther north, in Sunart and Ardnamurchan it is still not uncommon. As many as fifty have been killed during the past ten years. Two were got in 1880 (about Jan. 20th), in Ardnamurchan, and these probably came in from Sunart (Sir Thomas Riddell's), where a few are usually obtained when trapping rabbits, but none in 1879 or 1880.

Two or three, on an average, are still obtained every year on Ardnamurchan, but they are decidedly scarcer than formerly. In Glenmore only one was killed in two years, *viz.* in 1861.

Forfarshire.—The last Polecat I can hear of in this county is one killed at Oldbar by Mr. Smart, about 1858 or 1859. One was trapped in the Carse of Gowrie in 1849 by James Keddie (*fide* Capt. H. W. Feilden).

Kincardine.—From this county I have few returns, finding a difficulty in obtaining a correspondent on Natural History topics. Mr. Mowat, formerly keeper at Ury, informs me that they were plentiful about 1843, as many as three having been killed by him in a morning, but only one between 1849 and 1853. In 1851 one attacked his ferret and nearly killed it. On an estate adjoining he never heard of one being killed between 1862 and 1869.

Aberdeenshire.—Polecats have long been extinct in the lowland districts of the county and in the north-west. About twenty-seven years ago (say 1853) one was killed in the "kiln-logie" of an old kiln on the farm of Boghead. About 1832 a young lad saw one on the moss of Pitsligo, gave chase to it, drove it into a drain, and succeeded in killing it. About 1834 one played great havoc in the hen-house of Know-Head of Pitsillie: after killing all the ducks it was caught in a trap. Since that time the Rev. W. Grigor, of Pitsligo, has not heard of one in that district. Mr. Sim says it is now extinct around Aberdeen. About fifteen years ago he used to receive a few for preservation, "but now none." The last he had, he writes, "was from Yokies Hill, parish of Mintaw, about ten years ago" (say 1870). In the Don Valley it has been extinct at least twelve years (say since 1868). Before that date Mr. James Robb, keeper at Kildrummy, in Upper Don Valley, used to kill two or three every year. In East Aberdeenshire probably extinct. Not known at Brucklay for the last ten or twelve years (say since 1870 or 1868). Twenty years ago they were numerous at Crathes, on the Dee, twelve miles above Aberdeen, when Mr. Will (now keeper at Keith) was there; he used to kill several in a season: now probably killed out. At Littlewood, on Donside, sixteen years ago (say 1863-64) Mr. Mackie (now keeper at Keith), in two years' trapping, killed upwards of thirty Polecats. He says the best way of trapping them is at a high rock or by the side of an old "dry-stane" dyke which runs over the hill. Build a small "housie" against the rock or dyke, shut in at each side, but open to the front; put the bait at the back and the trap at the opening; the trap must be roofed in. Of late years, however, in the east of the county it is stated to have reappeared. In an upholsterer's window at Frazerburgh is exhibited a large Polecat shot at Kinnaird Head, near the town, during the winter of 1879-80. It is stated to be extinct now in Braemar, and has not been seen for at least fifteen years (say 1865) in the Old Mar Lodge grounds.

Banff, Moray, and Nairn.—In these counties the Polecat, so far as shown by my returns, appears to be extinct, or nearly so. There used to be a few at Dalry, near Forres (Elgin), but when my informant left, at Christmas, 1876, they had been all killed off. In Darnaway Forest there are now probably none. The brother of the proprietor of Edintore (Banff), Mr. Hay, killed one twelve or thirteen years ago (say 1867-8), but none have been heard of at that place since. The locality is known to me, and was in a bank of whins near Keith. He caught it alive by the neck, like a ferret, carried it home and then killed it. Thomas Edward's encounter with a Polecat in the ruined Castle of Boyne will be remembered by those who have read the 'Life of a Scotch Naturalist,' by Smiles.

Invernesshire.—The abundance of the Polecat in certain parts of Scotland is testified to by certain records, of no very ancient date, left to us. Thus, in the 'Highland Note-Book' of Carruthers, it is noted that no fewer than one hundred and nine Polecats were killed during a war of extermination waged against vermin on the Glengarry shootings during the three years between Whitsuntide, 1837 and 1840. While the Polecat is now rare in the south of the county, and approaching extinction in many parts of it, it is still common in many of the wilder parts, especially in certain districts north of the Caledonian Canal; and it is still to be found in Badenoch, and towards the south-western extremity of the Canal is still not rare, and is reported as commoner than the Marten. North of the Canal it has become rare in the east. From 1855 to 1865 the Polecat may be said to have been numerous at Guisachan. It is now seldom met with, but in 1878 two were taken, and three the year before; none, however, were seen in 1880. Very few have been found since 1874 on Struy, Beauley. The present head keeper has only killed five. South of the Canal, in Ben Alder Forest, one Polecat was seen near Lake Errochd Lodge, in 1878. None have been seen in Abernethy and Glenmore for twenty years; in 1860 the last was trapped there. The last obtained on the Bellerich Estate (Mr. C. J. B. MacPherson's) was about seven years ago (say 1873), and the last I have recorded on Glenshero Estate, parish of Laggan, was on October 8th, 1867.

Sutherland.—Mr. T. E. Buckley writes to me as follows regarding this species in the east of the county:—"Polecats used to be very common at one time; but before I came to Sutherland rabbits had increased very much on the coast, and that seems to have attracted all the Polecats around, for although I never got but two skins, and I only heard of two more being got on the Brora shootings, on the next shootings, where rabbits abounded, a very large number were got, especially in one year. After that not one was got, just as if they were all exterminated. The last I got was a small one caught near the house in 1879." This congregating of Polecats occurs along the east coast wherever rabbits are plentiful, and on the west coast also, even where there are few or no rabbits. Thus in Stoir peninsula and the extreme western part of Assynt, Polecats are still not infrequent alongshore, but at more inland localities have long been scarce. Examining several lists of vermin killed in Sutherland, which I have before alluded to, I find that in Assynt and part of Durness, two Polecats were killed in 1870, three in 1871, two in 1872, one in 1873, one in 1874, and one in 1875. All of these were in Assynt and none in Durness. I doubt, however, whether this indicates a scarcity in Durness, but rather the superior skill of the Assynt trapper, though after all but little skill is required. A list of vermin killed on Glendhu shows an increase of late years of those killed between 1866 and 1880. This is partly owing perhaps to protection afforded in the wilder parts of the adjoining deer-forest and in the Reay country, and to Glendhu being now more preserved and more regularly trapped. In 1868, two; in 1872, eight; in 1873, up to May, four; in 1879, from June, two; up to May, 1880, two. A corresponding increase in all vermin killed, however, points to a different system being followed. In the Reay country itself between 1873 and six months of 1879, included, no less than twenty were killed.* On one shooting alone in Assynt one trapper's return shows somewhat interesting material. I reproduce that part of the list which relates to three species,—the Wild Cat, Marten, and Polecat,—all killed by one keeper unaided. These returns show the comparative numbers, productiveness, power of concealment, and to some extent "survival of the fittest in the struggle for existence," against the means used directly by man for their extermination. The table shows the abundance of the Wild Cat and Marten prior to 1874, and their scarcity and sudden decrease thereafter up to 1880; whereas the Polecat, though less abundant, was better concealed, or being confined to the coast-lines for the most part, more easily escaped, and continued not uncommon even down to 1879:—

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* In this list of vermin killed, no less than 368 Water Ouzels are included; but I have suggested to Mr. McIvor that the blood-money should

TABLE *showing comparative numbers of three species of indigenous Carnivora killed on one Shooting by an experienced Trapper in the twelve years ending* 1880.

	Wild Cat.	Marten.	Polecat.		Wild Cat.	Marten.	Polecat.
1869 . .	7	8	2	1875 . .	1	–	1
1870 . .	6	5	1	1876 . .	–	–	4
1871 . .	4	3	2	1877 . .	–	–	2
1872 . .	3	2	1	1878 . .	1	–	1
1873 . .	1	3	–	1879 . .	–	–	1
1874 . .	2	1	–	1880 . .	1	–	–

In the east of the county, on Dunrobin, four Polecats were killed in 1873, and no more are recorded until 1879, when one was obtained. Mr. C. Frazer believes that about thirty Polecats have been killed in the Reay Forest during the past ten years, but he has kept no lists; nor does it appear that any of the foresters and keepers in the Reay country kept any. They sent all their "vermin" direct to the factors.

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be taken off their heads and put upon the Hooded Crows, and he has since forbidden the killing of the former birds. They are no longer killed in Assynt, nor do I find any notice of them in any of my other returns of vermin killed. At one time the slaughter of the innocents was general.

SOME ANCIENT RECORDS RELATING TO THE WILD ANIMALS OF NORTHUMBERLAND.

Communicated by T. H. Nelson.

The following extracts, for which I am indebted to Mr. Robert Forster, who is engaged upon a history of Corbridge-on-Tyne, are taken from the Churchwardens' books of that parish, and relate to the heads of wild animals which two centuries ago were paid for out of the Churchwarden's "cess." These notes are interesting as showing the former abundance of several of the species named compared with the present day, when, in many parts of England, most of them are very rare or altogether extinct.

1677.

John Hoaron in Dilston, one wild cat head, one fulmart head. January the 27th Day. 1677
John Fawset in Corbridge, one otter head. Febru. ye twenty-fourth Day. 1677
John Hoaron in Dilston, one fox head. March 10th day. 1677
Richard Robinson, the Laughhouse, one fulmart head. March the 17th day. 1677
John Haggot in Dilston, 2 gleads heads. June the 8th day. 1677
John Fawset, one fox head. June the 24. 1677
George Hoaron in Dilston, one fox head. July the first day.
Robert Gray in Dilston, one fulmart head. July ye 8 day.
John Hoaron in Dilston, two fulmarts, one brocks head. Sep.
John Hoaron in Dilston, 4 fulmarts heads. Sep. the last day.
George Hoaron in Dilston, four wild cats heads and——*
George Hearon in Dilston, two ——* October the 21st day. 1677
Wild Cats heads, two fulmarts heads. October the 28th day. 1677
Nicholas Greenwell, one glead head. Novem. the 8th.
John Hudspeth ye holl, one glead head. Nov. the 16th.
George Hoaron in Dilston, one fox head, two fulmarts, two otter heads, and three wild cats heads. November.
John Hudspeth ye holl, one glead head. Nov. 23. 1677
John Fawset, one fox head. Novem. the 28th day.
John Fawset in Corbridge, one fox head. Novembr the 28th day.
John Fawset, one fox head. Decemr ye 9th day.

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* A portion of the page here is torn.

John Hoaran in Dilston, one fox head, three fulmarts heads. December ye ninth day. 1677

John Hoaran in Dilston, two fox heads. Decembr the 16th day. 1677

Richard Corington in Corbridge, one fox head. Jany ye 3 day.

1702.

John Hypell, 5 fox heads. May 13, 14, 15th.

Thomas Jopling 1 brock head. June 1.

John Heypell, 4 gleads heads. June 1.

Thomas Jopling, 2 brock heads. June 3.

Ralph Lumbly, one fox head. June 4th. 1702

John Hypell, 2 brocks heads. June 5th. 1702

George Rothwell, 1 brocks head. June 10th. 1702

Robt. Barnes, 1 brock head. June 10th. 1702

Thos. Jopling, 2 brocks heads. June 13th. 1702

Michael Stokoe, 1 otter head. June 10th. 1702

John Armstrong, one fulmart head. July 8th. 1702

John Addison, one fulmart head. Sepr. 30. 1702

John Addison, one fulmart head. Octr. 4. 1702

Thos. Jopling, 1 fulmart head. Octr. 5. 1702

Cha. Hutchinson, one fox head. Decr. 8. 1702

John Addison, one fulmart head. Jany. 13. 1702

John Haggart, 1 brock head, 2 fulmart heads. March 14. 1702

1723.

Thos. Jopling, 1 fulmart head. April 10. 1723

John Armstrong, 1 wild cats head. April 11. „

Thos. Jopling, 1 fulmart head, April 12 more 2 fulmart heads. „

Robt. Rutter, 1 fulmart head. April 13. „

Edw. Giles, 4 fulmart heads. Jany. 13. „

Matt. Thompson, 2 fox heads. April 14. „

John Hepple, 1 fox head. Aug. 15. „

Wm. Milburn, one brock head. October 6. „

Abraham Fawsit, one fulmart head. Oct. 26. „

John Hepple, 5 fox heads. November 18th. „

Matt. Thompson, 1 glead head. December 16th. 1723

1741.

Miscellaneous Items.

To Dr. Charlton, for a fox head, 1*s.*; a fox and an otter head more . . . . 1*s.* 4*d.*

3 fox heads by Mr. Fenwick's huntsman* . . 0 0 " 0 3 " 0 0

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* It is stated by Mackenzie, in his 'History of Newcastle' (1827), vol. i., p. 293, that it was customary so late as the seventeenth century for persons

Mr. Fenwick was the owner of the Bywell estates; one of his huntsmen (possibly the one here mentioned) was drowned when crossing the River Tyne while following the hounds. His body was afterwards found on the coast of Holland, and recognised by the name engraved on his horn, which was fastened to a leather belt.

1743: 23 fulmarts heads and a wild cats head to Cath. Robson 0 - 8 - 0
1705, Sepr. 30, John Thompson, 18 fulmart heads, 1 cat & 1 glead head.
1690, Oct. 29: John Haggard in Dilston, 2 fox heads, 1 brock head, 2 cats heads, five fulmart heads.
1704: Dec. 3: John Thompson, 10 fulmart heads, 1 glead head.
1729: April 19: Wm. Brown, 5 gleads heads.
1710: Jan. 14: Wm. Bell, 13 fulmarts heads, 2 wild cats heads.

Total number of Wild Animals killed around Corbridge between the years 1677 and 1724.

Foxes	at 1*s*. per head	367
Fulmarts	„ 4*d*. „	653
Brocks	„ 4*d*. „	119
Wild Cats	„ 4*d*. „	141
Otters	„ 4*d*. „	27
Gledes	„ 3*d*. „	153
	Total	1460

These numbers scarcely represent the correct total, for several pages in the accounts referred to have been torn or defaced, and doubtless more animals were killed than are here accounted for.

During the period when wild animals were numerous in this district there was comparatively little cultivated land, the greatest part being moor, common, or waste land, thick forests, boggy ground, and rabbit warrens. An Act of Parliament was passed in 1766, "for the division and enclosure of certain open common fields, stinted pastures, and common moors or waste grounds within the manor and parish of Corbridge," and was completed in 1779. Not only were all these lands divided, but good roads

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to bring the heads of foxes slain within the parish of All Saints, Newcastle-upon-Tyne, and nail them to the church-door, for which they were paid by the Churchwardens a shilling a head. An order was made at Easter, 1674, that the new chosen Churchwardens should not allow the continuance of this practice, but that all such persons should go to the town chamber, and there demand the old custom.—Ed.

were made wherever required within the said boundary. This encouraged and facilitated an increase of cultivated ground, and just in proportion as cultivation extended, so did the number of wild animals decrease. It is now many years, with rare exceptions, since Glede, Brock, Wild Cat, or even a Fulmart were seen. Mr. Forster saw a Brock, a long time ago, which had been caught at Eden Castle Dene, near Corbridge. Fifty years ago, Magpies, Owls, Hawks, Jays, &c., were numerous, now they are rarely seen in this neighbourhood, having been destroyed as "vermin" by the gamekeepers.

THE LAND AND FRESH-WATER SHELLS OF THE NEIGHBOURHOOD OF YORK.

By Robert Miller Christy.

The district, the Conchology of which I have attempted to treat in the following pages, may be briefly described as a circular tract of country having the city of York as its centre, and a radius of about fifteen miles, though by far the greater number of species mentioned have been obtained in the immediate vicinity of the city. Throughout I have adopted very nearly the same nomenclature as Mr. Jeffreys, in his 'British Conchology.'

The list is to a large extent the result of my own research, but for assistance and information I have especially to thank Mr. James Backhouse and the Rev. W. C. Hey, of York, Mr. H. Richardson, of Newcastle, and other friends. Their contributions are distinguished by having the initial letter of their respective surnames affixed. Mr. Hey has gone so far as to prepare a list of what he has observed, and I have extracted much valuable information from it.

As the Geology of a district has such an important bearing on the Conchology, my friend Mr. J. E. Clark, of York, has kindly forwarded me the following remarks on the district under consideration. He says:—

"The Geology of the district is not of a character to make a very extensive catalogue probable, as there is an entire absence of chalk or limestone rocks within the area. The magnesian limestone runs almost north and south on the west about eight miles distant; whilst the wolds on the east, consisting of oolitic and chalk rocks, do not approach within ten miles, but would doubtless produce different species of shells. The Ouse Valley between these low-lying escarpments is formed of a succession of recent deposits lying upon the Keuper and Bunter beds. These cannot greatly affect the Conchology of the neighbourhood, as they only approach the surface here and there, as near Poppleton and Rufforth. In the Ouse Valley itself boulder clays, with limestone, sandstone, and igneous blocks, form the chief beds. These are separated by glacial sands, which produce numerous waste moorlands when forming the surface soil, the clays below making them very retentive. Such are Strensall and Riccall Commons, Tillmire, and other tracts of equally poor land, though now cultivated. The clays often rise to small hills, seventy to a hundred feet above the Ouse, such as the site of the Retreat, the Mount, Severus' Mount, &c. Near the river their crests are chiefly gravel-beds, evidently the boulder clay rearranged, with the lighter parts sifted out. Depressions occasionally contain peat, as at Askham Bog, the Foss Islands, &c.; but are generally levelled up with brick-earths, which also underlie these peat deposits."

Our chief localities for water-shells are the broad and sluggish Ouse, with its smaller tributary, the Foss, Askham Bog and Hobmoor, the latter being a group of very large and weedy brick-ponds, and the former a mixture of brick-ponds, bog, wide marshy ditches and wood. For a fuller notice of it and its numerous Natural-History productions, including shells, I must refer the reader to a series of papers that appeared last year in 'The Natural History Journal,' and have now been published in a pamphlet form (W. Sessions, York). It appears that there are at least forty-one species of Mollusca found within its borders, and on a recent visit of the Yorkshire Naturalists' Union, twenty-three were obtained, though *Ancylus lacustris* and *Zonites radiatulus* were missed. To the localities mentioned must be added numerous ponds in the corners of fields, and various ditches and streams. Askham Bog and Hobmoor also are among the most productive of the localities for terrestrial mollusks, as well as the extensive Jugs beside the river at Clifton and Bishopthorpe. In acquiring material for this list I have largely availed myself of the herculean labours of our two rivers in the way of shell-collecting. This, though a most productive way of obtaining information and specimens, is a method which to my mind is not sufficiently taken advantage of by conchologists. The vast number of small shells collected and deposited in certain places even by a little stream is surprising, but it is considerably less so when we consider what a large area its waters cover when in a flooded state, and that all small shells float when empty. The principal sorts so to be obtained are the *Zonites*, the smaller *Helices* and *Clausiliæ*, but particularly the *Pupæ* and *Vertigoes.* As my drift for examination has been entirely obtained near the city, it cannot well be urged that the shells in it have travelled from beyond our boundaries.

I am far from believing that the list is a complete one, though the eighty-nine species, or thereabouts, mentioned make a very fair total. I shall always be pleased to hear of any additions.

I. AQUATIC MOLLUSCA.

BIVALVES (*CONCHIFERA*).

Order LAMELLIBRANCHIATA.

Fam. SPHÆRIIDÆ.

Sphærium corneum. — Fine and abundant throughout the district generally. The finest specimens I have got near York are from Foss Islands (H.) Pale grey variety at Askham Bog (H.)

Var. *flavescens.*—Not uncommon. Good at Hobmoor and Askham Bog. "Very abundant this year in the lower part of the Foss" (H.)

Var. *nucleus* and var. *pisidioides.*—I have taken both these near the city, but cannot name the exact locality.

Sphærium rivicola.—Abundant and fine in the River Foss at Blue Bridge (H.) Rare in the Ouse.

Sphærium ovale.—Mr. Hey writes:—"Abundant and very fine in the Foss, burrowing to a depth of several inches in the mud. I first found it near Blue Bridge in the summer of 1874; but it was nearly killed by a severe frost when the water was let off in January, 1880, so that in June following I was not able to find any specimens."

Sphærium lacustre.—A comparative rarity throughout the whole York district. I have occasionally obtained it at Hobmoor, Askham Bog, Stockton-on-the-Forest, and in the Foss. Common in ponds at Rawcliffe, and also in several ponds near Clifton, in which it positively teems at times, but at others is scarce (H.)

Var. *Brochoniana.*—"Used to occur at Layerthorp on the Foss, but I have not seen it of late years" (H.) In August, 1876, the Ouse was lowered, and the water remained for several days about ten feet below its usual level, affording an excellent opportunity for shell collectors. Among other things seven or eight specimens of this variety were obtained under large stones. It is much larger than the type-form, very flattened, and the umbones small but prominent. Mr. Hey writes:—"The profusion and variety of *Sphæriums* in the Foss is remarkable, the whole genus abounding at one place; but it is grievous to have to mourn its growing rarity, as it is most unpropitious for mollusks when the water is let out of the river in winter and the poor wretches are frozen to death."

Pisidium amnicum.—Fairly common both in the Foss and in the Ouse, but I have not met with it elsewhere.

Pisidium fontinale.—Common.

Var. *Henslowana.*—"Common in sand dredged from the river Ouse" (B.)

Var. pulchella.—Common enough, I believe.

Var. *cinerea.*—I have met with this in the ponds on Tillmire, and a few other places.

Pisidium pusillum.—Generally distributed (H.) Specimens from York in the British Museum. Hobmoor, Askham, &c. I once found myriads in a tiny ditch in the centre of a field between Bishopthorpe and York. The water was very strongly impregnated with iron and their shells encrusted with it.

Var. *obtusale.*—Also specimens in the British Museum. Common generally.

Pisidium nitidum.—Streams at Hobmoor, according to Mr. Joseph Taylor, of Sunderland.

Fam. UNIONIDÆ.

Unio tumidus.—In the Ouse, but very rare. Abundant in the Foss. Mr. Hey says that it was formerly very common in the latter river, but is now very rare on account of its being killed by the frost when the water is let out in winter. "There are two distinct forms:—(*a*) Wedge-shaped, ventricose, thick, and of a rich red-brown colour; (*b*) Longer, thinner, greenish, and almost the var. *radiata.* I have some specimens which are curved like *margaritifer;* others which seem intermediate between *tumidus* and *pictorum*, and one of abnormal dimensions and thickness."

Var. *radiata*.—Occurs among the rest.

Var. *ovalis*.—"Ouse above York" (Brown's 'Illust. Conchology,' p. 111).

Var. *radiat-ovalis*.—In November, 1877, I obtained from the Foss, by Yearsley Lock, several dead specimens of the variety which has, I believe, received this name at the hands of various Bristol conchologists. In shape it is the same as the true var. *ovalis*, but differs from it in colour, which should be of a very dark brown, but is light greenish, like the var. *radiata* ; hence the name.

Unio pictorum.—Very fine and very abundant in the Ouse, but the number below the city far exceeds that above. Also in great profusion in the Foss, particularly near Foss Islands (H.) From one specimen I obtained a pearl about the size of a No. 1 shot, but irregularly shaped.

Var. *radiata*.—Pretty common among the rest.

Var. *curvirostris*.—Both in the Ouse and in the Foss, but not common in either.

Anadonta cygnea.—Fine in the largest pond at Hobmoor, and probably also at Askham. Very abundant in the Foss above Yearsley Lock (H.) A gigantic specimen in the York Museum came out of Fairfield Pond (H.) A curious stunted form is found in the Ouse near New Walk (H.)

Var. *rostrata*.—A number in the Foss are, I believe, of this variety.

Var. *avonensis*, Turton.—In the Ouse, but not abundant. I do not know what this corresponds to in Mr. Jeffrey's work.

Var. *radiata*.—In the Foss near Blue Bridge, abundant and very fine (H.)

Anadonta anatina. — Prevails in the Foss below Yearsley Lock (H.) To be found in the Ouse in any quantity; but none are large, the biggest I have seen not measuring four inches in width. Whether the inhabitants of York eat them or not I cannot say, but frequently when the water has been low, and I have been collecting them, I have been asked, in the most innocent way possible, whether I was going to do so. When the river is lowered, they extend their large foot and crawl down the bank into the water again, their track being shown by a queer cut in the soft mud. The *Unios* appear not to have the power of doing this. At such times, too, a great number fall victims to the rats, which break their shells and eat the mollusks inside, though the thicker shells of the *Unios* defy them.

UNIVALVES (*GASTEROPODA*).

Order PECTINIBRANCHIATA.

Fam. NERITIDÆ.

Neritina fluviatilis.—Many in the Foss near Yearsley Lock. Very abundant in the Ouse both above and below the city, but particularly so just above Scarbro' Railway Bridge, where there are a great many stones which they frequent. All those in the Ouse are more or less what Mr. Jeffreys refers to when he says, "Mr. North has found a black variety in the Ouse." Whoever bestowed upon it the name of "variety *nigrescens*" might well have saved himself the trouble, for in my idea its colour is due to nothing but the impurities in the water.

Fam. PALUDINIDÆ.

Paludina contecta.—"Stream near York," say Dixon & Watson, doubtless referring to the locality near Cherry Hill well known to Bootham conchologists of ten years ago, but now almost forgotten. In October, 1877, I visited the stream this mollusk used to inhabit, but found it now so surrounded with houses and in such an indescribable state of filth, from the refuse of some works being thrown into it, that it was difficult to imagine any Mollusca living there. I and others have visited it unsuccessfully, and I am afraid it must now be looked upon as a locality of the past, though I have more than once found dead specimens near by.

Paludina vivipara.—This is difficult to obtain when the water in the Ouse is at its full height, but when it is lowered, as it was in August, 1876, I could obtain it in any quantity. Above the city it is rather uncommon, but below it abounds, and lives principally clustered round the mouths of the small ditches and drains that discharge into the river on the Bishopthorpe side. Probably it prefers these situations on account of the sewage and filth there to be obtained. Many of those obtained in 1876 contained young, forty or fifty in each being no uncommon number. I was much interested in watching some that I had in an aquarium, where, under the influence of clear water, in a few weeks they lost most of the thick incrustation on their shells. Meat was their principal food, and if in a high state of putridity it mattered nothing. Young specimens seemed to be far more lively than older ones. On one occasion one of my largest specimens underwent the misfortune of being ejected, and for more than three weeks lay on the ground in a field, but upon being restored to its fellows seemed to have taken no harm. On May 11th, 1877, a young one was born and others followed until the 18th. At first each seemed to be enclosed within a ball of slime, but after getting free of this was very active. A few years ago the number in the River Foss was very limited, but Mr. Hey writes that, "Though it continues to abound in the Ouse, by far the finest specimens now come out of the Foss, where it has grown equally common."

Var. *albida.*—I admit this only with great doubt, there being no recorded variety of this name, nor have I ever heard of specimens, except two in the collection in York Museum. They are pure white, rather small, and have "var." written on their label. The late curator, Mr. Wakefield, says they are genuine, and were left by Prof. Phillips, but their locality is quite unknown.

Bythinia tentaculata.—Very common. Foss, Askham Bog, Hobmoor, &c. A variety with a single white band occurs at Askham Bog (H.)

Bythinia Leachii.—Common, but not generally of large size, in the River Foss. Mr. Hey says only as far up as Huntington. Also in a small stream joining the Foss near the third lock. It has the power, like most other operculated water-shells, of remaining out of water a considerable time, even weeks.

Fam. VALVATIDÆ.

Valvata piscinalis.—Abundant in the Foss, from which I have a specimen with the whorls much distorted. Ouse at Naburn. Also occurs, but rarely, in Askham Bog (H.)

Var. *depressa.*—Specimens from York are in the British Museum.

Var. *acuminata.*—Few in the Foss (R.)

Valvata cristata.—Pretty numerous in the Foss and its small tributary, a few in the Ouse, and very abundant in certain ponds at Askham Bog, where Mr. Hey says it is greatly on the increase.

Order PULMONOBRANCHIATA.

Fam. LIMNÆIDÆ.

Planorbis lineatus.—The Bootham 'Observer' states that this used to be observed in the Hobmoor ponds. The same authority says that in 1855 it was found in the ponds on Tillmire, and four years later in the direction of Osbaldwick, but I have met with it nowhere except at Askham, where in certain of the ponds it positively teems, though in others it is not found. Unlike the following species, which generally lives among decaying leaves in very stagnant ponds, this seems to prefer clearer and shallower pools where grass is growing.

Planorbis nitidus.—Rather sparingly distributed in the York district. I have found it, but not commonly, in the Foss and in one pond at Hobmoor. A pond near Rawcliffe Lodge (H.) Abounds in a pond beyond the first toll-bar on the Wiggington road and in some of the Askham ponds (H.)

Planorbis nautileus.—Found abundantly in some ponds at Askham Bog and Hobmoor, rarely in the Foss, and very probably in other places, but its small size renders it difficult of discovery. Rare in the Ouse (R.) Several ponds near Clifton, but specimens from here are only slightly "crested" compared with those from Askham (H.) The caddis-worm is very fond of sticking the shells of this species to its case, their roughness doubtless giving a secure hold. I have cases with one hundred or more sticking to them.

Planorbis albus.—Sparingly distributed. I have met with it pretty commonly in the Foss; also in some of the ponds on Strensall Common, at Hobmoor, and Askham. Near Osbaldwick ('Observer,' 1859). Pond on Clifton Jugs in profusion (H.) Holgate Brick Ponds (H.)

Planorbis spirorbis.—General and abundant, particularly in the many small ponds in the corners of fields near the Bookham Junction signal-box. Also Askham and other places. It teems on the Bog now (H.)

Planorbis vortex.—In great numbers in a ditch on Clifton Jugs, a pond beside the Foss, and a few other places, but by no means common or widely distributed. Mr. Hey has never found this, and doubts whether I am not mistaken.

Planorbis carinatus.—Common and well distributed. Askham, Hobmoor, the Foss, &c., are its localities.

Planorbis complanatus.—Very abundant. Found in most suitable ponds or ditches. Askham, Hobmoor, the Foss, Bishopthorpe Jugs, ditches round Huntington, &c. It is much subject to monstrosity; one was obtained at Bishopthorpe which rose in the centre like a cone, and another I got near the Foss had the whorls very much distorted.

Var. *rhombea.*—A few in a pond at Bishopthorpe, and in one of the Hobmoor ponds. This must be distinguished from the young, which also has little or no keel.

Planorbis corneus.—Clifton (H.) Strensall, Askham, Hobmoor, stream beside the Foss, Bishopthorpe, &c. Common. Especially good at times near the latter place. The very young specimens have a curious appearance, being hairy.

Planorbis contortus.—Pretty common. Abundant, but always small, both at Askham and Hobmoor. Larger, however, at Bishopthorpe. Thousands upon thousands of exceedingly fine specimens live in a tiny pond—than which I never saw a filthier—near the south end of Scarborough railway-bridge.

Physa hypnorum.—Very abundant indeed in the York district, and, I think, unusually fine. In vast numbers in a certain pond at Bishopthorpe, where I could obtain it by handfuls one summer, when it was dried up. One individual actually measured four-fifths of an inch in length. Also common in the ditches there, by Acomb Wood, the stream on Clifton Jugs, the small ditch where I found *P. pusillum* so numerous, a dirty ditch beside the public footpath to the north end of Scarborough bridge, Poppleton, Bootham, Tillmire, Strensall, Knavesmire, and elsewhere. Pond near Burton Lane, Clifton (R.)

Physa fontinalis.—Decidedly less common than the last species mentioned. Unusually fine in the Foss, near Huntington (H.), and at Hobmoor. Also found at Askham, Bishopthorpe, and many other places.

Limnæa peregra.—Of course found in the greatest abundance. A ditch that produces nothing else will certainly yield this. Doubtless many other named varieties occur, but I have not studied them sufficiently to be able to identify them. One I kept in captivity deposited two lumps of spawn, containing about 280 eggs altogether, upon the glass on the 19th May, 1877. These hatched on the 19th June following. The young were lively and crawled about at once. A dwarf form abounds in deepish water in the Ouse (H.) A very large form, hardly distinguishable from *L. auricularia* (with reflected lip, &c.), at Middlethorp. A long-spired and small-mouthed form used to occur in a ditch at Clifton (H.) Intorted spire, very like *L. involuta;* one specimen in the Foss (H.)

Var. *ovata.*—Not uncommon, I believe.

Var. *acuta.*—Not uncommon. Water-tank, Bootham.

Var. *acuminata.*—Abundant in the largest pond north of the railway at Hobmoor. In shape it is very like a small *L. auricularia* having the lip inflated. In mild weather they often crawl on the top of the duckweed, and if a breeze blows them up to one end of the pond they are to be obtained in great numbers.

Var. *succineæformis.*—A small, fragile form in a pond at Askham, I think, answers to this.

Limnæa auricularia.—Occurs rarely in the Ouse, and used to do so more abundantly in the Foss than at present. A few years ago, when the water was let out, it was to be found in great numbers, and often very fine; indeed Mr. Wakefield, the late curator of the museum, once showed me some from here far larger than any I have ever seen from elsewhere.

Var. *acuta.*—Pretty common in the Foss, and also very fine at times.

Limnæa stagnalis.—Quite a rarity, compared with its abundance in some districts. It is, however, common in one pond and some of the ditches at Askham, but it never attains a large size there, and its shell is mostly much corroded. Common in one or two ponds at Hobmoor, a few in the Foss, and in a ditch near Strensall, and abundant in a pond on the Common itself. It varies much in shape, those from the last locality having very short spires.

Limnæa palustris.—Rather well distributed; in a ditch behind the Foss near Huntington, in one pond and many of the ditches at Askham Bog, common.

Limnæa truncatula.—Abundant with, I think, several of its varieties. Puddles in Skelton Lane, &c. (H.) Ditches by Bishopthorpe, on Clifton Jugs, by Acomb Wood, Walmgate Stray, &c. It is semi-amphibious, and if the tiny ditches it frequents happen to dry up, the consequences are in no way serious to it.

Limnæa glabra.—This seemed to me to become suddenly abundant during 1877. At any rate I had always before that looked upon it as quite a rarity, but in the autumn of that year I found it plentiful in various ponds near the Bootham Junction signal-box, on Tillmire, in ditches along the sides of both Acomb and Knavesmire Woods, in various ponds and ditches on or near Strensall Common, and several other localities. Mr. Jeffreys mentions York as a habitat and it used formerly to be found at Langwith (B.) It also occurs now in the first pond at Askham Bog (R.); and in many ponds about Clifton, sometimes in abundance (H).

Var. *albida.*—About Clifton (H.)

Ancylus fluviatilis.—As there are so few streams round York adapted to the requirements of this species, it is not to be wondered at that it is rare. It lives in fair numbers in stony places in the Ouse and also in the Foss, where the current runs over many large stones at Yearsley Lock.

Ancylus lacustris.—Few and small in the Foss, at Hobmoor, Askham, and doubtless some other places. A sure method of finding it is to pull up the large flags and other weeds and carefully examine them. Fairly abundant in a pond on the Wiggington Road (H.)

(To be continued.)

ORNITHOLOGICAL NOTES FROM LANCASHIRE.

By F. S Mitchell.

The following notes represent some of the experiences of myself and my coadjutor, T. Altham, for the last few years in Clitheroe and its neighbourhood. The town lies in the middle of the Ribble valley, which is both well wooded and well watered, and is bounded on one side by Pendle, over 1800 feet in height, and on the other by the lesser fells of Waddington and Grindleton. There is, therefore, plenty of variety of bird ground, and within a radius of three miles from Clitheroe seventy-three species breed yearly, from the Curlew to the Grasshopper Warbler, and from the Twite to the Landrail.

I have been for some years working at the birds of Lancashire, and should be very grateful for any aid in the way of lists of residents and rare visitors in any part of the county, and in fact for any information coming within the scope of the subject.

In 'The Zoologist' for 1872 Mr. J. E. Harting has included amongst the Yorkshire heronries, "Browsholme Hall, near Clitheroe, in the West Riding (Mr. Parker)." At that date this heronry was not in existence, having been deserted for some time, but I am glad to say that it has been rehabilitated, and that there is every prospect now of its continuance. The birds have chosen a clump of very fine old spruce trees on the Pilling-Taylor estate, just on the opposite side of the road to that of Browsholme, and on the Yorkshire side of the Hodder, about a mile from the river. Mr. Parker is, however, taking great interest in their welfare, and the thanks of all naturalists are due to him and to Col. Hargreaves, who has the game-right, for preserving from molestation the breeding-place of this interesting species. The Herons first made their appearance in 1877, and on the 31st March in that year a nest of five eggs was seen by Altham. Since then they have been under constant observation by myself and him, and perhaps the following notes may be acceptable.

A nest which, on the 8th April, 1877, had four eggs, a few days sat, and two of which we left, had on April 22nd one of these eggs just chipped by the young inside. On April 29th there was only one young one newly born, and it would appear as if the one preparing to emerge on the 22nd had died, and been got rid of somehow.

Another nest, on April 8th, had five eggs, a few days sat; three were left, and on the 22nd we found two young just hatched, one of which I took. On April 29th I took the second young one, now a week old; the remaining egg was only just hatched, the legs of the young bird being entirely flesh-coloured.

The soft parts of the young are coloured as follows:—Immediately after birth the irides are a very light yellow, the upper mandible black, with a white spot at the point, the lower a pale yellowish horn-colour and black-edged; the throat outside of a pinky flesh-colour, and the gape a bright pink; legs and feet lead-colour in front, yellowish behind; claws horny. At one and two weeks the gape was not as brightly coloured, the throat outside being olive-green; the legs and feet were of a decided olive-green in front, the colour behind being lighter, and more tinged with yellow; abdomen yellowish green; claws black. At three weeks the irides were a very bright yellow, the upper mandible being greenish black, lighter on the culmen, and with the white spot still near the point; the lower mandible yellowish horn, gape pink, legs dusky green, and claws black.

In the stomach of that two weeks old I found about half a yard of line, with a broken hook at one end, and two lead sinkers attached; no doubt the old bird had got hold of a fish caught by a night-line, had torn it loose, and presented the whole arrangement to its offspring.

The total number of nests in 1877 was eight, and three eggs was the smallest complete number. They were all in the tops of tall spruce firs, being placed on the branches a little way out from the trunk, and were composed of large sticks, lined with finer twigs. Between the extreme edges, though the sticks here were very loosely put together, they measured about two feet and a half, and in the middle were six inches thick.

Some nests have a considerable depression, preserved until the young are hatched, when of course they are flattened completely, whilst others are almost flat to begin with. On April 14th, 1878, a very flat nest, which a few days before had two eggs in, was empty, the eggs being found at the foot of the tree; they must have rolled out somehow. In 1878 there were fresh eggs on April 4th, and in 1879 on March 23rd. On May 17th, 1879, we counted sixteen nests from which the young had gone. One held one young one almost full-grown, and two others had eggs in, no doubt from birds whose first clutches had been taken, some boys from the town having managed to elude the vigilance of the keepers. One or two nests were in outlying trees at some distance from the main body.

On March 21st, 1880, we saw seven nests with eggs, and on April 4th ten. On the 25th almost all the trees had broken shells under, and I climbed to one nest which had four young a fortnight old. On June 3rd all the young were flying, and they and the old ones careering overhead when disturbed were a fine sight. There were fifteen nests in all, and the largest number of eggs in any one was six. This year, 1881, I visited the place on March 27th, but no birds were visible, though the keeper informed me they had been about for two or three weeks. The weather was very wintry, deep snow being on the ground, and this had no doubt retarded them.

The year 1877 also brought another bird into this district, which I do not find previously recorded, viz., the Stock Dove (*Columba œnas*, L.) On May 3rd I saw a nest with two fresh eggs in a hole under a tree-root, which grew from a steep bank overhanging the River Hodder, about thirty feet above its bed. The female was caught on the nest, though its tail came out in the process (pigeons' feathers are so very loose), but I kept her for twelve months, and in that time she grew a very fine new one. In 1878 a pair brought up their young safely, just below Hodder Bridge, and in 1879 I took a nest containing two eggs, a week sat, from much the same position, in another steep bank as that first named. On March 26th, 1880, I met a boy who had taken two fresh eggs from one nest, and one from another; he said there were several pairs, and it is evidently spreading in this direction. On the sea-coast it is not uncommon. In 'The Zoologist' for July and December, 1873, appear records of nests taken near Southport; and Dr. St. Clair, of Blackpool, informs me that near St. Anne's he found a nest on the sandhills on May 13th, 1879, and caught the old bird.

In 1876 the well-known gullery on Pilling Moss was sacrificed to land improvement, and the plough, which for some time had been gradually approaching its precincts, finally effaced it in that year. It is a question whether the extra potatoes grown would have compensated for the good the birds do in the way of snail destruction, but, happily for the farmers, they did not migrate far, and at Winmarleigh, where they will receive protection, they found a suitable abiding place. They came to Pilling Moss about 1841, so that their sojourn there lasted thirty-five years.

The Corn Crake a few years ago had got quite scarce in Ribblesdale, and I think I remember observers in other parts of the country noticing the same thing. We fancy here that machine mowing has something to do with it, and there is no doubt that many more nests are destroyed by the closer shaving to which the meadows are subjected, and the relentless character of the machine scythe. In 1880, however, they were in larger numbers again. Perhaps they are getting more knowing, and the Corn Crakes with a greater knowledge of machinery are being "naturally selected."

The young Marsh Harrier referred to in 'The Zoologist' for 1879 (pp. 13, 14), died on July 26th, 1872, probably through some neglect, as I was away at the time. Its plumage was as follows:—Top of head white, bases of feathers white; general colour dusky, almost black; tail-feathers very slightly tipped with chestnut, the new feathers sprouting also thus tipped, all being white at the base; the inner web of the outermost feather clouded with chestnut from white portion to tip. Legs feathered to tarsal joint. Some feathers on nape irregularly margined with chestnut and white. Secondaries very slightly tipped with light chestnut, white at base. Primaries and tertials not so tipped. Primaries white at base, shading off through cloudy black to chestnut (especially on inner webs) to black upper part. Greater wing-coverts tipped with chestnut. Lesser wing-coverts not so. Most of small feathers clothing cubitus so much bordered with white and chestnut as almost to obliterate the black.

In 1879 I had a very interesting morning's ramble on May 10th, leaving home for Pendle Hill at two a.m. A quarter of an hour later, whilst still quite dark, Snipe were going "tick-tick," and a few Peewits calling. Two Snipe were drumming at the foot of the hill at half-past two, and a Blackbird or two called as I went up the gully called the "Big Nick" at three. Blackbirds and Ring Ouzels both breed among the furze-bushes here, sometimes in the bushes, and sometimes on the ground under them, and it is absolutely necessary, in order to identify nests properly, to see the birds. Curlews were calling soon after three, the dawn streaks just appearing, but I did not see them, as they were on another part of the hill.

In the middle of a smart shower of snow I disturbed a Golden Plover from its nest of four eggs, which turned out to be a week sat. She flew away with just one whistle when she had got twenty yards from the nest. I waited twenty minutes in hiding for her, but she only reappeared—though I heard her whistling a long way off—when I was packing the eggs by the side of the nest. She was very shy, and kept thirty or forty yards off, flying a long way when I moved towards her. These birds are more common on the Bleasdale fells, the other side the valley; Altham saw a nest on Parlick May 25th, with two young in down and a chipped egg. There were no Ring Ouzels to be seen, nor were there any Warblers in the Measley

Woods, but in the latter place I saw a male Redstart, the first of the spring.

The following story of a Peewit's nest is, I think, worth recording:—On the evening of May 15th Altham found it with four eggs in, three of which were completely covered by a dry cake of cow-dung, probably kicked over it by accident by the cattle. The birds had evidently been trying to remove it, but had not been able. The eggs were cold, but he took them home, put them in the oven all night, and at six a.m. next day took them to the nest again. The old birds met him at the stile, "as if they knew what he had got," he said, and the hen went on at once, after his replacing the eggs in the nest, and removing himself. Next morning three eggs were hatched, and the young gone; the remaining egg had got cracked.

Goldcrests were very scarce on Longridge this year, where generally they are pretty numerous. The severe winter must have thinned their numbers sadly.

On June 12th, between Blackpool and Lytham, I started several Nightjars from among the sandhills. They were either very sleepy or very tired, as I nearly caught them with my hands. If migrating, they were very late, as on Longridge they commonly lay their eggs the first week in June.

July 11th. Disturbed a Dipper from its nest, below which was quite a heap of young minnows. Saw a Kingfisher's nest also, with six fresh eggs, there being a great many fish-bones round them. A few years ago we almost despaired of retaining the Kingfisher about us as a breeding species. The demand for them was so great, owing to the prevailing fashion in ladies' head-gear, that they became nearly exterminated, and their being so easy to catch in nets didn't keep them. On one brook where were five pairs, a man, in a single afternoon netted nine birds. However, they are getting more numerous again now, and one can only hope that fashion will not for some time to come cast its evil eye on the feathers of birds.

October 1. Mr. Naylor had a Short-eared Owl brought him in the flesh from Balderstone, where it had been shot, and another (a very light variety) was killed on Longridge on the 10th. On the 1st also Altham saw a nest of young House Martins washed down by heavy rain; the old birds had tried to get them away for several days, but had not succeeded.

In the possession of Mr. W. Johnson, of Prestwich, I saw a very fine Bittern, which had been shot at Huntley Brook, near Bury, on December 15th.

On March 30th, 1880, Mr. Naylor had brought to him a Long-eared Owl, which a keeper had shot in mistake for a hawk, a Blackbird, by its notes of alarm, having called his attention to it. In its stomach was a bird of the Thrush family almost whole. All the Owls except the Barn, which is now most jealously protected by the farmers, and which it is thought unlucky to disturb, are ruthlessly shot down by the keepers, and they are rarely met with. A Barn Owl was once seen by some keepers to strike a young Pheasant about some coops in the late afternoon, but it left it where killed, and did not carry it away; it was thought it mistook it for a mouse. I was told a story of a Tawny Owl, which would seem to indicate much intelligence. It was observed several times to alight on the top of a Pheasant coop in the evening, and to flap its wings about so as, apparently, to disturb the old bird inside. On her moving the little ones, as usual, all ran from her, and were picked up by the waiting Owl outside and devoured. In the end of course it paid the penalty. On the western side of the valley here there is strict Pheasant preserving, and for the benefit of all egg-devouring birds, those of hens poisoned with strychnine are laid in conspicuous places. The havoc among Jays, Magpies, Rooks, and Carrion Crows is fearful. We are beginning to consider the Magpie a rare bird.

On May 8th walked over Pendle, near Pendleton Hall, heard the first Wood Warbler of the spring, and saw a Carrion Crow's nest, but did not climb up to it. On the slope at the foot of the hill the bird's-eye primrose was just coming into flower. At Deerstones took a nest of the Ring Ouzel with four eggs. Deerstones is the only rock on Pendle, and its ledges are sometimes used by the Kestrel for its nest. On a boulder at the foot of the rock are two depressions resembling a pair of long feet in shape, and the country people have a tradition that they are the footprints of his Satanic majesty, or, as they call him, "th' owd lad." A dog Fox and a lot of whelps were killed here in the winter.

May 9th. Spent this day on the moors near Todmorden, which separate Lancashire and Yorkshire. A single House

Martin, the first of the spring, was seen in the valley, and on the higher ground a pair of Ring Ouzels were disturbed, as also three or four Twites. Altham once found a Twite's nest on Pendle, and the old bird was singing as she sat upon her eggs. Our main object was to find the Little Stint, which has often occurred on these moors in May, but the ground was so dry from scarcity of rain and east winds that this had to be given up. A nest of young birds in down, thought by the finder to be those of the Little Stint, was taken on May 20th, 1876. These are still in his possession, and I borrowed one a little while ago, in order to compare it with Mr. Harvie-Brown's Petchora examples, which he kindly permitted me to do. Little doubt remained that it was a Dunlin, but the following particulars will show how important it is not to take uncertain nests of this sort without absolute identification. The finder of these young in down informed an old naturalist living near, a man perfectly acquainted with the Stints, and early in June he went on this moor, and saw an undoubted pair of the Little Stint, they being very tame, and permitting approach within five yards many times. No nest, however, was found. In 1877, on May 28th, another visit was paid, and a pair of birds again seen running like mice among the tufts, squeaking, but again no nest. 1876 and 1877 were very wet springs, and the moors were full of damp places, and covered with little pools. Every year since it has been very dry in spring, and no Stints have been seen. The old keeper who had been on the moor for forty years averred that he was familiar with a pair or two of birds, which appeared nearly every spring, not much bigger than larks, and resembling Dunlin, but without the black breast; he called them Little Dunlins, and was sure they bred. To some the idea of a bird breeding in Lancashire, whose eggs were unknown until the Petchora expedition may seem ridiculous, but I simply relate the facts, without drawing any conclusions, and only say that I have been impressed with the *bonâ fide* character of the evidence I have been able to gather. The Dunlin breeds every year on these moors, and we saw a fine one feeding, but could not raise its mate. It would seem to frequent the whole of the range. R. Leyland, of Halifax, says (Mag. Nat. Hist. 1828) that "it breeds on Blackstone Edge;" and on Pendle it has been seen several times in full breeding-plumage, though a thoroughly authenticated nest has never, that

I know of, been taken. Altham saw it on the Bowland fells in the spring of 1880.

On this 9th of May our further rambling brought us to the discovery of a Merlin's nest with four eggs, and Golden Plover were heard whistling in the distance, though we did not see them. A good many dead Grouse, all being males, were seen; the scarcity of water was very great.

June 3. Altham had heard a Chiff-chaff near the heronry, and we went to look for it, but did not any "chiffing" whilst we were there. He had also heard one near Colthurst, Sir John Holker's place. I had been told of its occurrence in this neighbourhood many years ago, but it has not been heard for a long interval till within a year or two. We have never been able to find a nest yet, though in Holland we saw them often, and spent a good many hours watching them. With regard to their note, too, we are unable to discover any different accentuation which might be translated into "chiff" and "chaff," though the late Mr. Thomas Garnett, of Clitheroe, always asserted this was the case. Maybe our ears are in fault.

June 20. Walking to-day over the Waddington Fells, and whilst looking for Nightjars in the open places of a little wood, we heard a tremendous row out on the open fell, and rushing to the wood-edge and peeping over the wall, we saw a great sight. Twelve old Curlews, all up at once, driving off four Carrion Crows. The alarm-note of the former became a perfectly hoarse bark, they were so enraged, and it was a long time before they settled again. We passed a sedge pool where, on May 31st, Altham saw a pair of Wild Ducks with seven young, and also came across a pair of Golden Plovers, very anxious, and with young doubtless. We found two Curlews' nests, both forsaken, one with two eggs in, and another with three, and about eight p.m. disturbed a pair of Twites, but could not find the nest.

In the first week of September, when sitting in the garden about seven in the evening, I noticed great numbers of Pied Wagtails flying into a high tree near. I began to count on September 2nd, and although the tree-top was already swarming, I saw 450 pass into it. It is common to see Pied and Ray's Wagtails roosting together in autumn in bushes overhanging ponds, but I never saw such an assemblage as this before. It went on every evening for about the whole week, and might have been a party preparing for migration, though this species remains here in large numbers the whole winter. A Nuthatch, a rare bird here, was caught in one of the greenhouses at Waddow Hall some time about September. The gales from the north-east at the end of October brought quite a lot of uncommon birds into the neighbourhood. A Storm Petrel was caught in Padiham about the 23rd. The 'Manchester City News' recorded the capture of another at three a.m. on the 29th, and on the evening of the same day a third was killed by a cat at Rawtenstall.

A female Rough-legged Buzzard (recorded in the local papers as a Snowy Owl) was shot near the freestone quarries on Waddington Fell on October 30th; another was shot on Haslingden Moor by a Mr. Senior on October 11th, and several more have been already noticed in 'The Zoologist' and 'Field' as occurring in other parts of Lancashire.

On November 6th six Swallows were pointed out to me by Mr. Naylor flying about the streets of Whalley. It had been exceedingly frosty up to the morning of the 4th, when the wind changed to the south-west, making it very mild.

A birdstuffer in Clitheroe had two female Goosanders, which had been shot out of a flock of nine birds on January 22nd, 1881, on the Ribble near Henthorn. I saw the man who had killed them, and he said the flock had been on the river above a week.

February 15th. A Short-eared Owl shot on Bashall Moor on this date was brought to Mr. Naylor. This is a very favourite resort for these birds, and there is no doubt if they were let alone they would remain to breed. But that shall never be, say the guardians of the Pheasants.

On February 8th a Great Crested Grebe was shot on the Ribble, near Hacking Boat.

Geese were moving in February. On the 17th a flock of about eighty was seen by Altham, very high up, going from east to west, and a correspondent on Morecambe Bay informs me he saw a few Bean Geese on the 18th, and large flocks on the 19th, all going northwards.

ORNITHOLOGICAL NOTES FROM DEVON AND CORNWALL.

By John Gatcombe.

Early in January a Green Sandpiper was obtained near Plymouth, a very unusual date for this species to be met with in our neighbourhood, since it generally appears early in the autumn, and then but sparingly. Strange to say, I do not remember ever having seen a fresh specimen of the rarer Wood Sandpiper in the hands of any of the Plymouth birdstuffers, although it has not unfrequently been met with in Cornwall, especially in the Land's End district. Razorbills, Guillemots, and Kittiwakes were very plentiful, and some young Great Black-backed Gulls also made their appearance, as they generally do, just after Christmas, and later towards spring pairs of adult birds appear in great numbers previous to leaving for their breeding quarters. Several adult Gannets were obtained, and the stomachs of those I examined were full of Sprats.

On January 9th there was a very cold wind from the E.N.E. A large Northern Diver was fishing off the Devil's Point, Stonehouse, and an immense flock of Gulls, consisting of three or four hundred of various species, were to be seen crowding close together on the rocks near the Hoe, presenting such a sight as I never before beheld in that locality. The next day there was a great fall of snow; unusually severe weather followed; and our markets were soon stocked with Wildfowl, among which were Shovellers, Pochards, Tufted Ducks, Scaups, Shelldrakes, and immature Golden-eyes, with common Wild Ducks, Widgeon, and Teal in great abundance. A Bittern, and some Sclavonian Grebes, one Great Crested Grebe, and one Red-necked Grebe were also obtained. With regard to the Red-necked species, I have often been puzzled with its great variation in size; so much so, indeed, that I have almost been inclined to think there might be two species, or at least races of it. I have also met with specimens like that mentioned by Mr. D'Urban in 'The Zoologist' a short time since, having stripes on the cheeks and neck; but these markings are undoubtedly indicative of immaturity, as in the young of the Great Crested Grebe; yet the examples I have seen so marked happened to be unusually large ones. The bills of the Red-necked species, too, I find vary considerably both in length and thickness.

Herons and Curlews suffered much from the severe weather in January, many having been brought to the markets. Bramblings and Hawfinches (rare birds in this district), have also visited us, some of the former having been noticed in the middle of the town. Some Stock Doves in the market were obtained in the neighbourhood, and the first, the market people said, they had ever received; they certainly are but rarely met with in this locality, although I am aware that large flocks annually visit the more eastern parts of Devon in November to feed on the beech-mast. Immense quantities of Lapwings were killed; and one fine old male which came under my inspection, having the longest crest I ever saw, had already nearly acquired the black chin and throat of the breeding season. Many Brent Geese and a few Bean Geese made their appearance, and one Wild Swan was killed on the River Yealm, near Plymouth. Woodcocks and Snipe arrived in great abundance, and among the former I examined a very pretty pied variety sent from Cornwall, having a pure white patch on the top of its head, a ring round the neck taking in part of the chest, and white wing-coverts, the bases of the primaries also being tinged with the same; the other parts were of the usual colour, or perhaps a shade lighter, the whole plumage strongly reminding one of that of the Snow Bunting in winter; its legs appeared to have been nearly of the usual tint, with the exception of a pure white claw on one toe of each foot.

Strange to say Fieldfares and Redwings were exceedingly scarce during the heavy fall of snow; hardly any were to be seen in or around the town, although our gardens were swarming with Starlings, Blackbirds, and Thrushes in the most distressed condition; yet, I am happy to add, that notwithstanding hundreds were trapped, shot, and killed in various ways, the sufferings of a great number were greatly alleviated by their being daily and liberally fed by the more humane portion of the population. Missel Thrushes almost entirely disappeared from the neighbourhood, and I remarked that there was not the usual migration of Larks, Starlings, Fieldfares, Thrushes, Redwings, &c., along the coast from east to west, which has particularly attracted my attention in previous years during the first heavy fall of snow. But I think I cannot do better than give a few extracts from a letter written by my friend Mr. Clogg, of Looe, Cornwall, concerning the starving birds. He says:—"Woodcocks and Snipes were seen in our streets during the severe weather, and Starlings, Larks, Redwings, &c., were constantly to be seen hopping about the streets, looking most miserable. The boys of this place and Polperro are great adepts at bird-catching with bent pins attached to a short string, one end fastened to a peg, which is driven into the ground, the pin baited with a worm. I have this year heard for the first time of five Woodcocks having been taken by that method. I was at Liskeard on New Year's Day, and on visiting the birdstuffer there, I saw a variety of the Common Thrush, bright buff on the back, and all the other parts usually of a much darker colour, with the black spots on the breast replaced by a very pale brown. It was in excellent feather and well mounted. On my visiting the same shop, I believe in September last, I saw a Red-necked Phalarope, which had been shot a week or two before at Dosmare Pool, and was in full winter plumage."

The severe weather had a great effect on the Green Woodpeckers, numbers of which were brought to our birdstuffers; the males in exceedingly fine plumage. A few Common Buzzards and many Long- and Short-eared Owls were also obtained. On January 28th, I examined a fine old Herring Gull, which had already assumed the pure white head and neck of the breeding season, also some adult Waterhens with splendid crimson and yellow bills and red garters. I have not as yet met with any kind of Merganser except a single immature Smew.

On February 1st an adult male Scoter was killed off Mount Batten, in Plymouth Sound, and on the 4th I examined an adult Common Guillemot in perfect breeding plumage. It was probably this early assumption of the nuptial dress which misled Colonel Montagu, and in a great measure tended to confirm him in his belief that the plumage of the Guillemot was the same at all seasons; for, in the Supplement to his 'Ornithological Dictionary,' he writes:—"In the latter end of January, 1805, as cold and severe a winter as for many years had been experienced in the West of England, several of these birds were shot in the estuary of Kingsbridge, some of which we examined, &c. These had the exact plumage of those which frequent our rocks in summer, and in every respect so exactly corresponded with the summer dress of the 'Foolish Guillemot' that it should seem to prove beyond all doubt that the Lesser Guillemot is perfectly distinct, and that the 'Foolish Guillemot' is at no season differently marked."

Another Red-necked Grebe was obtained, and a pair of Red-breasted Mergansers, the male in full adult plumage, very uncommonly met with in the West of England. I examined the stomach of the male, but could find nothing in it with the exception of a few intestinal worms. Several more Gannets were killed, a few Shovellers, and a second adult male Scoter. I hear that a large flock of Wild Swans was seen at Moorland, in Somersetshire, and my friend, the Rev. G. Robinson, writes from Ireland that Wild Swans have been observed on Lough Neagh, and a Velvet Duck killed in Dublin Bay.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By John T. Carrington, F.L.S., and Edward Lovett.

(Continued from p. 142.)

Before commencing our observations on genera and species, we wish to draw the attention of our readers to a series of important papers, illustrated with plates, which have appeared in the British Association Reports, by Mr. C. Spence Bate, F.R.S., &c., upon the 'Present State of our Knowledge of the Crustacea.' They are as follows:—Part I., On the Homologies of the Dermal Skeleton, in Report 1875. Part II., the same subject continued, in 1876. Part III., Correlation of Appendages, &c., in 1877. Part IV., On Development, in 1878. Part V., On Fecundation, &c., in 1880. In our first article of this series, at page 98, our remarks upon the 'Manual of Marine Zoology,' by Mr. P. H. Gosse, F.R.S., do not quite fairly describe that work, which treats of the subject of Carcinology to the extent of fifty-seven pages, and includes diagnoses of the class, its orders, suborders, families, genera, with a list of species then known, and figures in most genera. In fact, want of space curtailed our intended eulogy of this most useful work, which is invaluable to the student of our marine fauna.

With regard to arrangement, we propose to follow the classification of M. Milne-Edwards, as used in his 'Histoire Naturelle des Crustaces'; and will deal first with the genus.

STENORHYNCHUS, Lam.

This genus belongs to a wide order, popularly described as "Spiders," though the species in it deserve this title more than those of several allied genera which are nevertheless known by the same name.

In the species of this genus the body is usually about three-quarters of an inch long, roughly triangular in shape, with the lower angles rounded and the forward one continued acutely into a rostrum varying in length in different species. The carapace is symmetrically spinous; the legs long and slender; the rostrum tapering and dual; the abdomen six-jointed; the eyes oval and fixed on a prominent stalk or peduncle and are non-retractile.

"The young of *Stenorhynchus*" (says Mr. Spence Bate, p. 85, Brit. Assoc. Rep., 1869), "is a true zoë, but differs from the typical form in the absence of the great rostral spine, and in the increased length of the great dorsal spine, by a series of latero-dorsal spines on the three posterior somites of the pleon, and in the enormous development of two deciduous spines on the base of the second pair of antennæ."

In the lists of British Crustacea hitherto published, carcinologists have only given two species of this genus as indigenous to Britain, viz., *Stenorhynchus rostratus* (= *phalangium* of Pennant), and *S. longirostris* (= *tenuirostris* of Leach), but we have now the pleasure of adding a third, the *S. ægyptius* of Milne-Edwards. This we shall describe in its place.

Specimens of this genus may be dried rapidly, but carefully, for the cabinet, without dissection. But specimens of all should also be preserved in spirit for careful examination when required, as dried examples are not so well adapted for that purpose.

To explain more fully the points of difference in the rostra and frontal appendages of the three species of the genus *Stenorhynchus*, we have made the sketches, three times larger than life, which appear in each case with the descriptions.

Stenorhynchus rostratus, Linn.

This species answers well to the generic character of the carapace, having it acutely triangular, with rounded lower angles and a short, stout rostrum. Its surface is rounded and spinous, three of the principal spines being in the form of a triangle, with a fourth midway between the two lower ones. One of the chief characteristics of this species is the absence of the minute spine immediately at the base of the antennæ, on the epistome, which spines are present in both *S. ægyptius* and *S. longirostris*. The rostrum is notched vertically throughout its entire length, and is

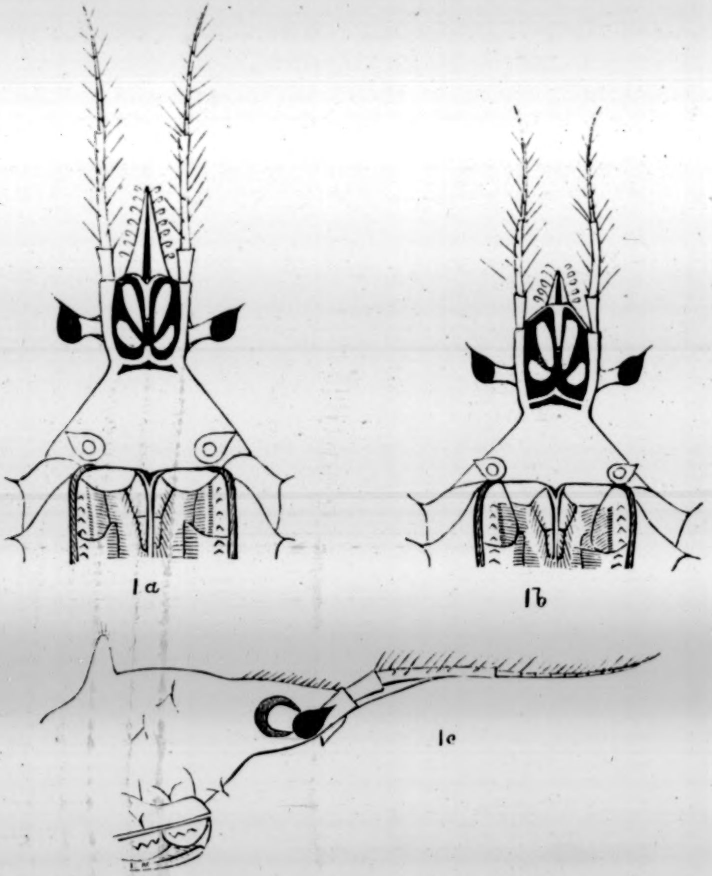

Fig. 1 *a*. Portion of under side of male *S. rostratus*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 1 *b*. Same view of female. 1 *c*. Lateral view of same portion of male.

hairy and of moderate length, reaching only to the middle of the third joint of the antennæ-stalk. This latter feature is also characteristic, as the rostra of both the following species are longer, and in other features different. The five pairs of legs are very long and slender, the last two pairs having the terminal joint curved like a cat's claw, whilst the preceding two pairs have this joint more simply formed and hairy, like the other joints. The anterior pair are developed into stout arms, terminating in a rather formidable pair of forceps in the male; whilst the corresponding pair of legs of the female are comparatively but slightly developed. From this it would appear that the males of this and many allied species have a requirement, pugilistic or otherwise, which the females have not. The stalked eyes are oval, with a minute spine on their pointed apex. The abdominal segments of the females are broad and roughly pear-shaped, affording great protection to the ova; whilst those of the male are narrower, widening suddenly at the third and fourth somites, and again slightly at the last. A jointed ridge divides these segments equally and vertically.

We have taken ova from this species in the early part of the year. These ova are well concealed by the broad somites of the females, and carried by the swimmerets to which they are attached by semi-elastic, transparent, viscid ligatures, which are extremely slight as compared with those of Crustacea with less abdominal protection. The ova are minute, spherical bodies, of a pale yellow colour when newly extruded, and become granular and darker as the development of the zoeæ proceeds. The first marked indication of the maturity of the enclosed zoeæ is the prominent eyes, which give the eggs a speckled appearance.

This species is much the most commonly met with of the genus, attributable, no doubt, to its habitat being usually shallow water and estuaries of rivers. We have obtained great numbers from the shallower parts of the English Channel and the neighbourhood of the Thames estuary, those from the former locality being very fine and bright. Of the large number of *S. rostratus* examined, we have found very few, and those generally females, covered by fuci, as mentioned by Bell. On the other hand, the species may be characterised as one generally clean and bright. We have noticed most markedly the great predominence of males in catches of this species, as observed by Bell and subsequent writers.

In addition to the Channel and Thames estuary, already mentioned, this species has been recorded, amongst other localities, from St. Andrew's, Shetland (frequent on hard stony ground); Orkney, Guernsey, Dublin Bay, Galway (very common); Belfast, Scarborough, Aberdeen coast, the Hebrides, and South Devon. In 'The Zoologist,' 1877, Mr. Cornish writes that it is not common in Mount's Bay, Cornwall.

Stenorhynchus ægyptius, Milne-Edwards.

This species is described by M. Milne-Edwards as a Mediterranean form, common near the shores of Egypt and Sicily; and is also referred to by Bell in a short foot-note. It is of the same general character as the preceding species, but with several marked distinctions.

The carapace of this species, though broadly resembling *S. rostratus*, is more elongated and graceful; the rostrum is covered with a great quantity of hooked hairs, which distinguish it at once from *S. longirostris*, and it is much longer than that of *S. rostratus*, reaching nearly to the end of the peduncle of the antennæ. M. Milne-Edwards remarks, "Rostre n'atteignant pas tout-à-fait l'extrémité du pédoncule des antennes externes." On the epistome there are two minute spines situated at the base of the antennæ, as in *S. longirostris*, of which Milne-Edwards says, "Epistome armé de chaque côté de deux épines placées l'une au devant de l'autre"; but we have seen specimens in which there were two on one side, and only one at the base on the other side, showing no appearance of being worn away. There are also, as in *S. longirostris*, two small spines on the basal joint of the antennæ, which we have never found in *S. rostratus*. These features are sufficiently defined to mark this species at once, and it is with much pleasure, and with some surprise, that we are able to record this addition to our fauna. The specimens which we obtained were dredged in company with *S. rostratus*, but never with *S. longirostris*, and, as we fortunately obtained a number of specimens, we were enabled to discard entirely the probability of the specimens being varieties of either of the other two species of the genus.

The colour of mature specimens is dirty brown, but we have some half-grown which are of a beautiful pink, striped with yellow. This colour we have never noticed in either of the other species of this genus. In *S. rostratus* the young specimens are a dirty yellow, while in *S. longirostris* we find them either dirty brown or nearly approaching puce in colour.

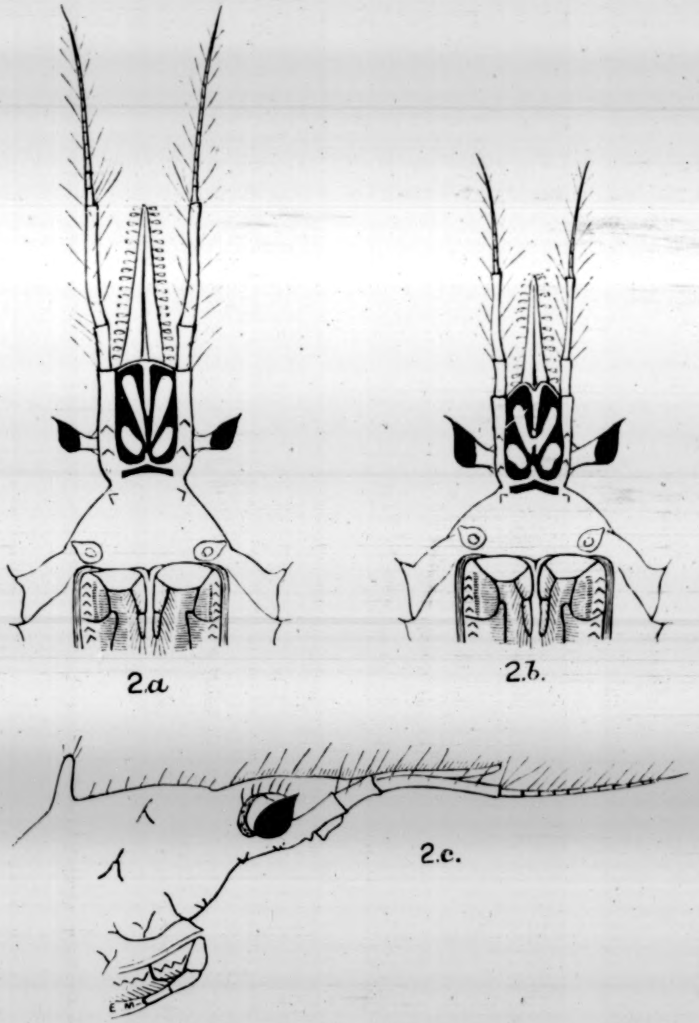

Fig. 2 *a*. Portion of under side of male *S. ægyptius*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 2 *b*. Same view of female. Fig. 2 *c*. Lateral view of same portion of male.

As regards the embryology of this species, we have had as yet no opportunity of making any observations, for, like *S. rostratus*, the larger number of those taken were males; but the females recently obtained (April) are full of immature ova.

The only locality from which we have obtained this interesting species is the English Channel, at a depth of some three to seven fathoms, off the Sussex coast.

Stenorhynchus longirostris, Fabr.

This species may be stated as resembling in general features the two preceding, with the following striking exceptions. The rostrum is very long, reaching beyond the antennal stalk, or, to quote Milne-Edwards's description, "Rostre dépassant de beaucoup le pédoncule des antennes externes." It is united throughout its entire length, and is much less hairy than those of *S. rostratus* and *S. ægyptius;* it is also pointed upwards, as will be seen in the

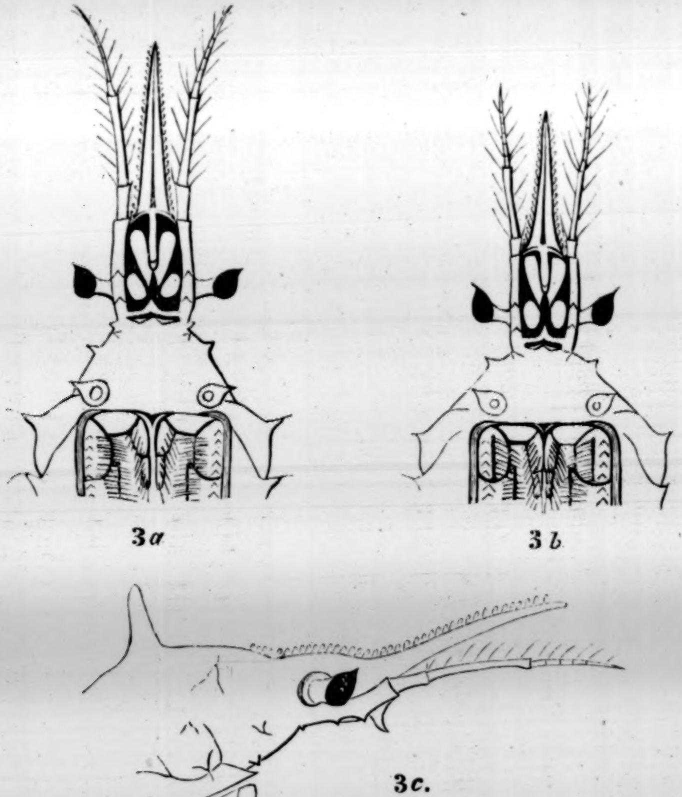

Fig. 3 *a*. Portion of under side of male *S. longirostris*, three times magnified, showing pedipalps, epistome, rostrum, and antennæ. Fig. 3 *b*. Same view of female. Fig. 3 *c*. Lateral view of same portion of male.

figure 3 *c*, whereas that of the other two are nearly straight and level with the antennæ. In fact, the rostra of the three species are sufficiently distinct and peculiar to characterise them without difficulty.

The spines at the immediate base and also upon the basal joint of the antennæ, is a feature of this species, as it is with *S. ægyptius*. *S. longirostris* also possesses a series of minute spines on the inner portion of the anterior legs or arms, and the spines on the body are more slender, and the body itself altogether more delicately formed than that of *S. ægyptius*.

S. longirostris is a deep-water species, and we have never obtained it from the same "catch" as *S. rostratus* or *ægyptius*, or *vice versâ*, so that it would appear that different species of Crustacea affect different belts, or zones, of depth, and that localities of marine forms are as marked and limited as in the case of terrestrial fauna and flora. We obtained our specimens from fifteen to twenty fathoms.

Besides the English Channel, this species has been taken off our north-east coast; also in the Shetland seas (where it is said to be rare), Aberdeenshire coast (commonly), the Hebrides, and south-west coast of England.

The ova are similar to those of *S. rostratus*, and the time of spawning about the same.

(To be continued.)

OCCASIONAL NOTES.

THE WILD CAT AND THE MARTEN. — The perusal of Mr. Harvie Brown's articles on these two species (pp. 8, 81), has recalled to mind a description of a combat between a Wild Cat and a Marten, which was witnessed many years since in Argyllshire, and which is related in a book published fifty years ago, and now probably little known, 'The British Naturalist; or, Sketches of the more interesting productions of Britain and the surrounding Sea.' No author's name appears on the title-page, but the writer's style seems to indicate that it may have been written by Robert Mudie. The combat above referred to is thus described (p. 54):—"In the year 1805, a gentleman, on whose veracity we can depend, witnessed one of these combats in the Morven district of Argyllshire. In crossing the mountains from Loch Sunart southward he passed along the bank of a very deep wooded dell, the hollow of which, though it occasionally showed green patches through the trees and coppice, was one hundred and fifty, or about two hundred, feet from the top. The dell is difficult of access, and contains nothing that would compensate for the labour; and thus it is abandoned to wild animals, and amongst others to the Marten, which, though the skin fetches a high price, is not so much hunted there as in more open places, because, though they might succeed in shooting it from the heights above, they could not be sure of recovering the body. Thus it is left to contend with the Mountain Cat for the sovereignty of that particular dell, and both are safe except when they approach the farmhouse at the bottom of the hill. The contest there lasted for more than half an hour, and both combatants were too intent on each other's destruction to shun or fear observation. At last, however, the Marten succeeded in falling upon the right side of the cat's neck, and jerking his long body over her so as to be out of the reach of her claws; when, after a good deal of squeaking and struggling, by which the enemy could not be shaken off, the martial achievements of puss were ended in the field of glory. The victories of the Marten over the Golden Eagle, though there be a tale of one of them at every place where Eagles and Martens are common, are not quite so well authenticated; and Wood-cats, Polecats, and even Weazels, which, though lithe and active enough in their way, are certainly nothing to the Martens, are often the heroes of the tale. It runs uniformly in the same manner:— Down comes the Eagle in the pride of her strength, slash go her talons into the limbs of the Marten, and, with a flap of her wings, she is soaring towards the zenith. The prey, however, is only scotched; and the Marten or the Weasel, or whatever else it may be, jerks round its head into the throat of the Eagle, and both fall lifeless to the earth. These accounts may be true, but they belong to that class of which there is a separate edition for every district, and therefore they would need verification by an eye-witness." —J. E. Harting.

Squirrels swimming.—Apropos of Col. Godwin-Austin's note (p. 102), I may mention that in the autumn of 1878 I was Salmon-fishing in the River Spey, a few miles from its mouth, where the stream was broad, strong, and deep—when just beyond the end of my line I perceived a Squirrel being carried down, but swimming higher out of the water than is usual with most animals. Its death by drowning seemed inevitable, as the opposite bank was a high, perpendicular cliff of old red sandstone, where even a Squirrel could hardly land. However, it swam gallantly on, heading straight across the stream, and finally, after being swept down a long distance, emerged on the other side, where a burn intersected the rock, and fir-trees grew down to the water's edge. The left bank, where the Squirrel must have entered the river, was low and shelving, and it selected a spot, accidentally or otherwise, whence the current carried it opposite to an easy landing-place on the right bank.—CECIL DUNCOMBE ('*Nature*,' March 24).

[Observers in the United States report a similar habit in the American Red Squirrel, *Sciurus hudsonius*. Mr. Frederick Hubbard, of New York, writes:—"Some years ago I was rowing on Lake George, in this State, when I observed one of these little animals in an open place, where from the course he was pursuing he must have swum nearly half a mile. He seemed almost exhausted, and when I held my oar towards him he readily accepted the invitation to come on board, ran up the oar, and then to my surprise ran up my arm and ascended to my shoulder! I do not know whether he simply followed his climbing instincts, or whether he sought an elevated point to get an observation. However this may have been, after a short pause he descended and took his station in the bow of the boat, from which in a few minutes he plunged into the lake and struck out for land. He evidently miscalculated his remaining powers, for he was unequal to the effort, and soon gladly availed himself of a second opportunity of gaining a place of refuge. He now sat quietly while I rowed him towards the land, evidently satisfied that he was in friendly hands, and that his wisest plan was to remain as a passenger. When close to the shore he made a flying-leap and scampered for the trees, doubtless grateful in his little heart for the kindness that had helped him over the critical part of his voyage. This was near the narrows of the lake, where it is about one mile in width, with groups of islands which shorten the traverses to less than a quarter of a mile. My little friend, however, had not availed himself of the easier and more circuitous route, but had boldly undertaken a directer course and a longer swim, which, but for the timely rescue, would very likely have been his last aquatic attempt." Another correspondent writes:—"While camping for two summers recently in the wilderness of northern New York, I was much surprised at frequently seeing Squirrels crossing the ponds and lakes of the region. We would sometimes find several of these strange navigators in the course of an afternoon's row. They were seen most abundantly during the early part of July; indeed, later in the season, they were but rarely found. During many summers of camping elsewhere I have never seen them take to the water. It has occurred to me that the explanation of this peculiarity (if it be such) of the Squirrels of this locality may be found in the nature of the region visited; for we find there a most intricate water-system, the whole region being dotted with ponds and lakes connected by small streams. The necessity of taking to the water at times has perhaps enabled the Squirrels to overcome their aversion to this element, and they have thus become semi-aquatic in their habits."—ED.]

PISCIVOROUS HABITS OF THE WATER SHREW.—My nephew and his pupil were recently strolling by the small stream which runs through his farm, when they were attracted by an exciting performance going on in one of the tiny pools. Approaching cautiously they were surprised to see an excited Water Shrew, *Sorex fodiens*, frantically diving, and after some attempts seize a small chub-headed fish, with all the pluck and ferocity of an Otter poaching in a salmon-stream. The fish after being seized made frantic efforts to escape, but quite unsuccessfully, till the Shrew, perceiving he was watched, let go his hold, the fish instantly sinking to the bottom, and the fierce little animal darting away for some harbour of refuge in the bank. They were much surprised at the performance, more particularly at the length of time the Shrew remained under water.—THOMAS HOPKINS (Limber Grange, Ulceby, Lincolnshire). [Communicated by Mr. Cordeaux.]

FLIGHT OF THE ALBATROSS.—When watching the Albatross one is struck with the fact that the bird gets up to windward without appearing to use his wings to a degree sufficient to account for the same. The sailors are satisfied with the explanation that he beats to windward. The conditions are of course not analogous to those of a ship sailing to windward. If the wind be very light, or if there be a calm, occasional powerful and obvious flapping of the wings occurs. If there is no wind, the birds often settle on the water round the ship. In very heavy weather the birds disappear altogether, probably settling on the water. Except that for breeding they resort to the islands, I believe they frequent the open ocean, where the surface is seldom without more or less swell. On watching the flight of the Albatross one observes that, in order to rise from the water, violent and obvious flapping of the wings is necessary, which is continued some time after the wings cease to strike the water. After a start has thus been effected, if there is a fresh breeze, the wings are kept almost motionless. Sometimes the bird goes some distance with the impetus derived from the flapping of the wings at the start, but sooner or later he turns so as to expose the plane surface of his wings full to the force of the wind, rising at the same time some height above the water, and drifts off to leeward, thus soon acquiring the velocity of the wind: then swooping down into the hollow between two swells, he turns his head to windward, and, keeping close to the surface of the water, sails along more or less against the wind for a surprising distance; finally, rising over the crest of a wave comparatively high into the air, and turning with his wings as before, so as to catch the wind to the fullest extent, he again lets himself drift off to leeward. Thus the manœuvre he performs seems to consist in drifting with the wind in such a way as to attain its velocity very soon, and then turning round so as to make use of this velocity to carry him in the contrary direction. Of course if he still remained exposed to the wind which had imparted to him its velocity he would not travel far against it before he came to a standstill, and he would certainly make no progress to windward; but by keeping close to the surface of the water, and as much as possible in the hollows between the waves, he is almost out of the wind; and in this comparatively calm region the impetus derived from the wind will carry him a long distance in exactly the opposite direction to that of the wind itself. This manœuvre appears to be an important factor. No doubt the almost imperceptible movement of the wings may assist, though that this alone is insufficient to account for the progress to windward appears evident from the powerful efforts made with the wings in rising from the water and in calm weather. I have never had an opportunity to observe the Albatross flying over land or over level water. If the manœuvre above described be an important factor, the birds then would have to use their wings much as they do in very light winds on the ocean. If very strong winds were blowing, they would have to settle on the land or in the water in order to remain at the locality.—ARTHUR W. BATEMAN, *in* '*Nature*.'

FLIGHT OF THE ALBATROSS.—There seems to be a prevailing idea that the Albatross in its flight is in some way "assisted by the wind." I think this is a mistake; the manner is well known. The method, I believe, admits of a very simple explanation. His secret consists in his power of acquiring great momentum together with the large superficial area of his extended wings; with scarcely a motion of his wings he will fly straight against a strong wind with a velocity greater than that of any race-horse: this is inconsistent with the idea of his being "assisted by the wind." In attempting to rise from the water (I believe he is unable to rise from the land or from a ship's deck) he flaps his wings violently to get his body out of the water; at the same time, paddling rapidly with his webbed feet, he acquires a moderate degree of momentum, sufficient, with outstretched wings, to carry him forward and upward upon an easy incline. The case is similar to that of a boy taking a run with his kite-string in his hand to give his kite a start. During this first rise he will generally give a few heavy, lazy flaps, and then stretch his wings steadily to their full extent; now, as he gradually rises, he must of course as gradually lose his acquired momentum till it suits him to acquire more, when he may be twenty, thirty, or fifty feet above the surface, but a much greater distance from the place where he left the water, measured on the surface; by slightly altering his position, by a movement of his tail, he takes a shoot downwards at an angle that suits his convenience, still without his wings outstretched. This is precisely the case of a boy shooting down a coast on his sled; the propelling force is the same. The bird directs his course mainly with his tail, the action of which upon the air is identical with the action of a ship's rudder upon the water. By this downward motion, his velocity rapidly increasing, he acquires a degree of momentum sufficient to carry him up again to a height equal to or greater than that from which he started. In this up and down long wave-like motion, with all its variations on either side, consists the whole of his flight day after day for hundreds of miles; at long irregular intervals he may give a few lazy flaps with his immense wings, Other birds use the mode of flight of the Albatross, but to a smaller extent, for the reason, in the case of smaller birds, that, the ratio of feathers to bulk being greater, their specific gravity is less, consequently they are unable to acquire the degree of momentum necessary to carry them upward; but on the other hand they have the power of sustained effort in moving their wings rapidly, which the Albatross has not. Gravitation then, which prevents him from rising directly on the wing, is the motive power of the Albatross when aloft. He must always take a run or paddle over the surface of the water in order to get a start, and on the land or the deck he is a prisoner, because he has no water in which to paddle himself along with his webbed feet, and he is unable to run. Instead of being assisted by the wind, his speed is lessened by just so much as the wind's velocity, when it happens that the direction of the wind and his intended course are opposed to each other, but with the wind his speed is just so much greater than it would be in a calm. I do not advance this explanation as an imaginative theory. I claim more for it. I have had many opportunities of studying the movements of the Albatross for consecutive days, and I feel confident that the above will be found to answer all required conditions. — HOWARD SARGENT (Cambridge, U.S.), *in* '*Nature.*'

WINTER BIRDS NEAR REIGATE, SURREY.—The following are a few brief notes from Gatton, in Surrey, which may perhaps be of interest to readers of 'The Zoologist,' although not containing anything very important. On New Year's Day I saw a Hawfinch, the first I have observed at Gatton. It was near a fine yew,—one of a line said to have extended in byegone days to the pilgrims' shrine at Canterbury,—but which in this berryless season had no provision of fruit on it. On January 5th I saw two drake Pochards on the lake. On the 12th the weather suddenly changed, sharp frost set in, and a large flock of Redwings made their appearance; the Waterhens showed signs of uneasiness, and the Wood Pigeons, which had hitherto been in great flocks, began to go. On the 13th there were twenty-seven Wild Ducks on the lake, and Wild Geese were heard passing over. On the 14th it was all frozen, and an ornithological scene presented itself. In the middle forty-three Coots huddled together on the ice, while in a little hole which had been kept open for the Swans four Little Grebes were bobbing up and down. On the 15th we had over 20°, and the whole lake bore. The number of ducks had increased to thirty, while the Coots dashed wildly about at the approach of the skaters, seeking open water where there was none. The Dabchick's hole was frozen; two were gone; the other two were squatting helplessly on the ice. I chased them into the reeds and caught one of them. Placed in a large glass-bowl it proved a most amusing diver, but as I had no minnows to feed it on, I sent it to the Zoological Gardens, where it soon died in the Fish-house. Its shyness was extreme, and it would often dive with such a quick start as to throw sprays of water seven or eight feet. In this respect it was very unlike a Sclavonian Grebe which was caught on the shore near Cromer on the 27th, and taken alive to my father's, where it was put into a bath with plenty of water, and which, either from exhaustion or a contented disposition, was as tame as the other bird was wild. The late Mr. Gould, in his 'Birds of Great Britain,' represents the inner circle of the eye of the Sclavonian Grebe as white, as do several other authorities, but in our bird, when alive, it was golden yellow. The Hawfinch turned up again at Gatton on the 11th February, apparently after the crumbs which had been put out to feed the small birds, as it approached close to the window. I remember, when at school at Braconash, in Norfolk, a Hawfinch which came very close to the window while the boys were at breakfast. Yet in nearly all works on Ornithology the Hawfinch is rightly accredited with being one of the shyest of birds. On the 26th, on going down to the lake, I immediately discovered a stranger, which was soon identified as a female Goosander. 1880 has been quite a winter for this species and the Smew. It was very agile and beautiful when swimming with one or two Coots abreast on either side of it, but looked droll enough squatting among some dead reeds by the side of the lake. I heard of it long after my departure, and believe that it remained there until April.—J. H. GURNEY, Jun. (Northrepps, Norwich).

ROUGH-LEGGED BUZZARD AND HEN HARRIER IN SURREY.—Last month I announced the capture of the Rough-legged Buzzard in Surrey, and stated in my note that I was informed the male bird had been trapped a short time previously. Since writing I have seen the supposed male, and find it to be the male of the Hen Harrier, the companion to which was trapped by Mr. Lambert's keeper in the same neighbourhood a short time since. I have now seen all three birds, and they are a female Rough-legged Buzzard and a pair of Hen Harriers, birds of the year, all trapped during the past winter in the neighbourhood of Chelsham, Surrey.—PHILIP CROWLEY (Waddon House, Croydon).

ORNITHOLOGICAL NOTES FROM OXFORDSHIRE. — Early in December last a Shag was shot whilst sitting on the ridge of a barn roof at Souldern. A female Goldeneye was procured on the canal on the 18th January, and on the 24th of the same month a Grey Crow was picked up near Banbury in a starving condition and brought to Mr. Wyatt, the Banbury birdstuffer, who kept it for some days, and then let it go. This bird is usually rather rare here, but this autumn I have heard of three specimens having been killed. On the 5th inst. I put up three Short-eared Owls from some long grass in a wet, marshy meadow. About the end of the frost Mr. Wyatt had no less than ten Green Woodpeckers brought in, besides three Hawfinches and other birds—all picked up dead, and very thin and poor. Kingfishers have also suffered very much; a great many were found in the Cherwell when the ice broke up. Bramblings shot about the same time were in very good condition.—OLIVER V. APLIN (Bodicote, near Banbury).

"HUMMING" OF THE SNIPE.—With reference to the article on this subject in the last number of 'The Zoologist,' I beg to suggest, in accordance with a note I find in 'The Zoologist' for 1846 (p. 1501), that the Snipe, in the breeding season, may emit *two* sounds, one with the wings and tail, *i.e.* "drumming" or "humming," and one, called "bleating" or "whorring," emitted when the bird is on the ground, but how emitted I will not venture to say. This suggestion, if it prove correct,—and I leave it to abler persons than myself to prove or disprove it,—would reconcile the conflicting views of Dr. Altum and Herr Zöppritz, and the evidence they produce in support of their respective theories. The writer of the note above referred to says that he has heard the Snipe emit the sound, above referred to as "bleating" or "whorring," when he has been close enough to see that the sound was unaccompanied by any motion of the wings.—LIONEL P. FISHER (Harrow).

PECULIAR NESTING OF THE BLACKBIRD.—About four or five years ago, when I was staying at Chalbury, Wimborne, Dorset, on the 22nd of June, as I and a friend were walking in a field which was put up for hay, my attention was suddenly called to a bird's nest built on the ground, with three fine young birds in it, just fledged, which turned out to be a Blackbird's. The nest was situated in an open space, a long way from any hedge, and was composed principally of small twigs, roots, and mud, lined with bents of grass. I think this is rather a rare case. I have found five instances mentioned in 'The Zoologist' for 1873, some of which nests were built at the butts of trees in a wood, and some on hedge-banks, but I do not think there was one in an open field.—H. C. WARRY (Pembroke College, Cambridge).

TEAL NESTING IN YORKSHIRE.—On April 18th a nest and eggs of the Teal were found on Strensall Common, near York, a former breeding-place of this bird. The nest, on which the bird sat very close, was placed at the side of a clump of heather, some distance from water, the sides being slightly raised, with a small depression in the middle, and was constructed of dead grass with feathers intermixed, and not (as stated by the Rev. F. O.

Morris) "lined thickly with feathers." It contained twelve eggs quite fresh.—W. HEWETT (26, Clarence Street, York).

LITTLE EGRET IN YORKSHIRE.—Allow me to record the occurrence of the Little Egret, *Ardea garzetta*, which was shot on January 4th, 1881, near Haybourn Wyke, four or five miles north of this town, and is now in the possession of Mr. Thompson, a bird-preserver at Scarborough. The specimen is in very fair plumage, but is deficient of the long feathers which form part of the occipital plume.—ROBERT P. HARPER (2, Royal Crescent, Scarborough).

LATE APPEARANCE OF THE GREAT GREY SHRIKE IN PERTHSHIRE.—A specimen of this species, a female, was shot by my gamekeeper here on March 19th, in a small piece of cover. It was in fine plumage. This seems a very late period for its occurrence. The stomach contained the remains of a Blue Tit.—JOHN J. DALGLEISH (Brankston Grange, Culross, Perthshire).

CRANE AT SCILLY.—A Crane, *Grus cinerea*, has been forwarded to me from Scilly, and is being preserved for the Lord Proprietor of the Islands. It is an adult female, the ovary containing eggs about the size of a pea.—W. H. VINGOE (Penzance).

SALMON AT SEA.—In May, 1880, the nets of the driver 'Wanderer' of Mousehole, Richard Pentreath, master, fishing fourteen miles north-west of the Scilly Islands, took a Salmon of twenty-seven pounds weight, in excellent condition. There was no fresh-water course worthy of the name of even a small river within one hundred miles of the place where the capture occurred. In the week afterwards on the same ground the nets of the driver 'Thetis' took a Salmon of twenty-eight pounds and a half, in such good condition that it sold on the quay at Scilly to the buyers for London by auction for £3 0s. 9d.—THOMAS CORNISH (Penzance).

THE SWIMMING-BLADDER OF FISHES.—In a note to the Paris Academy, Prof. Marangoni gives the results he has arrived at in a study of the swimming-bladder. He states, first, that it is the organ which regulates the migration of fishes, those fishes that are without it not migrating from bottoms of little depth, where they find tepid water; while fishes which have a bladder are such as live in deep, cold water, and migrate to deposit their ova in warmer water near the surface. Next, fishes do not rise like the Cartesian diver (in the well-known experiment), and they have to counteract the influence of their swimming-bladder with their fins. If some small dead and living fishes be put in a vessel three-quarters full of water and the air be compressed or rarefied, one finds in the former case that the dead fish descend, while the living ones rise, head in advance, to the surface. Rarefying has the opposite effect. Fishes have reason to fear the passive influence due to hydrostatic pressure; when fished from a great depth, their bladder is often found to be ruptured. Thirdly, the swimming-bladder produces in fishes twofold instability, one of level, the other of position. A fish, having once adapted its bladder to live at a certain depth, may, through the slightest variation of pressure, be either forced downwards or upwards, and thus they are in unstable equilibrium as to level. As to position, the bladder being in the ventral region, the centre of gravity is above the centre of pressure, so that fishes are always threatened with inversion; and, indeed, they take the inverted position when dead or dying. This double instability forces fishes to a continual gymnastic movement, and doubtless helps to render them strong and agile. The most agile of terrestrial animals are also those which have least stability.

Unusual Weight of a Crab.—On April 9th a very large Crab was brought to my house that I might see it, but I was unfortunately from home at the time. I have to-day (April 11th) seen the man who brought it to me, and whom I know to be respectable and trustworthy, and he tells me it was taken in a trawl, and was weighed on board the trawler in his presence, and that it turned the scale at sixteen pounds avoirdupois weight. I write this with the reservation that I believe it to be true, but that I cannot vouch for it to my own knowledge. It is four pounds heavier than the heaviest I ever saw.—Thomas Cornish (Penzance).

[Mr. Carrington informs us that the largest Crab he ever heard of was a Norwegian one, and weighed eleven pounds. Bell, in his 'History of British Stalk-eyed Crustacea,' states that a weight of twelve pounds is occasionally attained.—Ed.]

Poisonous Qualities of the Star-fish.—On February 18th I picked up, on the shore here, a fine specimen of the Sun-star (*Solaster papposa*), which I took home and laid on my study fender to dry. On the 20th, during my absence from the room, two favourite cats of mine came in and ate the Starfish. They were discovered almost in the act, and nothing was thought of it at the moment. In about ten minutes, however, the smaller cat, which was about half-grown, was violently sick, and in less than a quarter of an hour was dead. Soon after, the other cat, which was full-grown, suddenly began to scream piteously, and was also sick. It soon became unable to walk or stand, and died (about two hours after eating the

Starfish), in violent convulsions. On examination I found the stomach empty, save for a few minute fragments of the shelly matter of the Sun-star. There was no trace of irritation of the stomach, the poison being apparently of the cerebro-spinal type. This case seems to corroborate the theory that Starfish kill bivalves by injecting poison between the lips of their shells.—CHARLES A. PARKER (Gosforth, Carnforth).

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

March 1, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary exhibited the cast integument of a large Spider (*Mygale bistriata?*) which had been shed in the Society's Gardens.

Mr. G. E. Dobson read a paper on the anatomy of the family *Erinaceidæ*, commencing with that of the curious and rare form *Gymnura Rafflesii*, with which the species of *Erinaceus* were compared. *Gymnura* was shown to be a peculiarly central form, the survivor probably of a once widely-spread group. Altogether, the anatomy of thirteen species of *Erinaceidæ* was treated of in this paper.

A communication was read from Mr. F. Moore, containing descriptions of some new genera and species of Asiatic Nocturnal Lepidoptera. The characters of 150 new species were given representing eighty-two genera, of which twenty-nine were new to science.

A communication was read from Mr. R. Collett, containing an account of the breeding habits of the Grey Seal, as observed on the Fro Islands, off Trondhjem's Fiord, in Norway.

Mr. R. Bowdler Sharpe read a note on the Fantail Flycatcher of Western Australia, *Rhipidura preissi*, of which he had lately had, for the first time, an opportunity of examining a specimen.

March 15, 1881.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called special attention to a female Bactrian Camel, *Camelus bactrianus*, formerly belonging to Ayoub Khan, which Colonel O. H. St. John, had purchased from its captors at Kandahar and presented to the Society; and to a male Wild Sheep, *Ovis cycloceros*, obtained from Afghanistan, and presented to the Society by Capt. W. Cotton.

Mr. A. G. More exhibited some eggs of the Red-necked Phalarope, believed to have been taken in England; and an egg of the Tree Pipit, taken near Dublin, this bird having been considered only doubtfully Irish. Mr. More also exhibited a specimen of the Red-crested Pochard, obtained near Tralee, being the first record of the occurrence of this species in Ireland. [See p. 143.]

Mr. R. Bowdler Sharpe exhibited a specimen of the so-called Sabine's Snipe, *Gallinago Sabinii.* This bird had been shot in July last by the Hon. W. W. Palmer at Wolmer Pond, near Selborne, Hants.

Prof. F. Jeffrey Bell read the fourth of his series of observations on the characters of the Echinoidea. The present paper dealt with most of the genera of the *Echinometiidæ;* their systematic affinities were discussed and their relations to the *Echinidæ* shown to be so intimate as not to justify their separation into two distinct families.

A second paper by Prof. Bell gave the description of a new species of the genus *Mespilia*, obtained at Samoa by the Rev. S. J. Whitmee, which the author proposed to name after its discoverer, *M. Whitmei.*

Mr. W. A. Forbes read the fourth of his series of papers on the anatomy of Passerine Birds. The present communication was devoted to the consideration of some points in the anatomy of the genus *Conopophaga* and of its systematic position.

A communication was read from Prof. Newton, in which he proposed to substitute the name *Hypositta* for *Hypherpes*, which he had formerly proposed for a genus of Passerine birds found in Madagascar.

A communication was read from Mr. M. Jacoby containing descriptions of new genera and species of Phytophagous Coleoptera.

April 5, 1881.—Prof. H. W. Flower, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of March, and called special attention to a young male Gooral Antelope, *Nemorhædus goral*, from the Himalayas, being the first example of this fine species that had been received; and to three Birds of Paradise belonging to the following species, deposited on approval:—the Twelve-wired Bird of Paradise, *Seleucides alba;* the Red Bird of Paradise, *Paradisea sanguinea;* and the Green Manucode, *Manucodia chalybeia.* The Secretary added a record of the weights and measurements of the four Indian Elephants now in the Society's Gardens.

Mr. Sclater exhibited five birds' skins obtained by the Rev. G. Brown on the island of Rotumeh, and presented by him to the 'Challenger' Expedition. Mr. Sclater also exhibited specimens of two new species of birds from New Britain, belonging to the Museum Godeffroi, which he proposed to call *Trichoglossus rufigularis* and *Ortygocichla rubiginosa.*

Mr. H. E. Dresser exhibited and made remarks on a specimen of *Saxicola deserti*, killed in Scotland [see p. 146], and a specimen of *Picus pubescens*, believed to have been killed in Normandy.

Mr. W. A. Forbes read some notes on the external characters and anatomy of the Californian Sea Lion, *Otaria Gillespii*, and exhibited some coloured drawings of this animal.

Prof. Flower read a note upon the habits of the Manatee, chiefly in reference to the question as to whether this animal had the power of voluntarily leaving the water for the purpose of feeding on the herbage of the banks, as stated by many authors, and as supported by a communication from the late Mr. R. B. Dobree, notwithstanding which Prof. Flower considered the evidence upon which the statement was based to be very unsatisfactory.

A paper was read upon the same animal by Miss Agnes Crane, consisting of observations upon the Manatees lately living in the Brighton Aquarium.

Dr. A. Günther read an account of the Amphisbænians and Ophidians collected by Prof. Bayley Balfour in the island of Socotra. A new form of Snake allied to *Tachymenis* was named *Ditypophis vivax*, a new species of *Zamenis* was named *Z. Socotræ*, and a new form of Amphisbænian, *Pachycalamus brevis*.

Mr. W. T. Blanford gave an account of six species of Lizards which had been collected by Prof. Bayley Balfour in Socotra; of these the three following appeared to be undescribed:—*Hemidactylus homæolepis*, *Pristurus insignis*, and *Eremias Balfouri*.

Mr. Charles O. Waterhouse read a paper on the Coleopterous insects which had been collected by Prof. Bayley Balfour in Socotra. The number of species of which examples were collected was twenty-four, and showed that the fauna of Socotra, judging from this collection, was distinctly African. Twelve of the species appeared to be new.

A communication was read from Prof. J. O. Westwood containing observations on two species of Indian butterflies, *Papilio castor* and *P. pollux*.

A communication was read from Mr. Edgar A. Smith, containing some observations on the shells belonging to the genus *Gouldia* of C. B. Adams.

Mr. Sclater read the fifth of his series of notes on the birds of the vicinity of Lima, Peru, with remarks on their habits by Prof. Nation. A new species of *Buarremon*, of which an example was in the collection, was proposed to be dedicated to its discoverer as *B. Nationi*.

Mr. G. E. Dobson read some notes on certain points in the muscular anatomy of the Green Monkey, *Cercopithecus callithrix*.—P. L. SCLATER, *Secretary*.

Entomological Society of London.

March 2, 1881.—H. T. Stainton, Esq., F.R.S., &c., President, in the chair.

Mr. H. Bedford Pim (Leaside, Kingswood Road, Upper Norwood, S.E.), was balloted for and elected an Ordinary Member of the Society.

Mr. E. A. Fitch, on behalf of Mr. A. S. Olliff, who was present as a visitor, exhibited a specimen of *Strangalia quadrifasciata*. This Longicorn was captured at West Wickham last August while flying round thistle-heads in the sunshine.

Mr. W. C. Boyd exhibited a specimen of *Nonagria lutosa* captured outside the Great Eastern Railway terminus in Liverpool Street; also a curious variety of *Ennomos tiliaria*, taken at light at Cheshunt.

Mr. W. F. Kirby called the attention of Members to a work on all Orders of Insects by Herr Buchecker, of Munich, which was now in course of publication, and exhibited some parts representing the Neuroptera and Lepidoptera. Mr. M'Lachlan said he could by no means recommend this work to the notice of the members, as in his opinion the author was much more of a photographer than an entomologist, consequently little new information was to be obtained, but much that was erroneous and misleading; the photographic plates were fairly good and accurate.

Mr. F. P. Pascoe read a paper "On the genus *Hilipus* and its Neotropical allies," in which about fifty species were described, all of which were exhibited.

Mr. W. L. Distant read "Descriptions of new genera and species of Rhynchota from Madagascar."

Prof. Westwood communicated a paper entitled "Observations on the Hymenopterous genus *Scleroderma* and some other allied groups."

Mr. M'Lachlan directed the attention of Members to a paper by Dr. Adler, just published in the last part of Siebold and Kölliker's 'Zeitschrift' (Zeit. für wiss. Zoologie, vol. xxxv., pp. 151—246, pl. x.—xii.) on the dimorphism of oak gall-flies (*Cynipidæ*).

The Secretary read a report, from the 'Western Daily Mercury,' of the proceedings of the Yealmpton (South Devon) Police Court on the 8th of February last, when H. W. Horton, a farmer, was convicted under the Destructive Insects Act of 1877, of being in possession of living specimens of the Colorado Beetle, and was fined £5. The Secretary also read a trenchant leading article from a later issue (February 12th) of the same paper.

Mr. Jenner Weir remarked that he had recently seen a living specimen of the *Doryphora* which had been brought to London in a barrel of potatoes.

April 6, 1881.—W. L. DISTANT, Esq., M.A.I., Vice-President, in the chair.

Dr. Victor Signoret (46, Rue de Rennes, Place St. Germain-des-Prés, Paris), was unanimously elected an Honorary Member, in the place of M. Achille Guenée, recently deceased.

Dr. G. W. Royston Pigott, M.A., M.D., F.R.S., F.R.A.S., &c. (Annandale, Eastbourne, Sussex), was balloted for and elected an Ordinary Member of the Society.

Mr. J. Jenner Weir exhibited a beautiful specimen of a Noctua found at rest in a nursery-garden at Blackheath, in August last. It was apparently a new species, and there was some difference of opinion among the members as to whether it came near to the genus *Dicycla* or *Gortyna*.

Mr. R. M'Lachlan exhibited three species of the genus *Dilar*, Rambur, one of the rarest genera of Neuroptera-Planipennia. They represented *D. nevadensis*, Rambur, from Spain (the typical species), *D. Hornei*, M'Lach., from North-West India, and *D. Prestoni*, M'Lach., from Rio Janeiro; thus the genus, although numbering very few species, and of a strongly characterized nature, is widely distributed. Mr. M'Lachlan alluded especially to the singular unilaterally pectinate antennæ of the males and the long thread-like ovipositor of the females; this latter indicating some special habit yet to be discovered.

The Rev. A. E. Eaton exhibited, as a microscopic preparation, a specimen of *Haplophthalmus elegans*, Schöbl., a woodlouse new to the British fauna. Two specimens were found in a garden at Croydon.

Miss E. A. Ormerod exhibited two *Termites* nests, forwarded to her by Mr. Everard im-Thurn, from British Guiana. One nest was nearly spherical in shape, being about two feet six inches in circumference, and encircled the small branch of a tree; in structure it consisted of a number of irregular chambers or passages, the walls of which were composed of a blackish granular substance from gnawed wood; these nests were also stated to be very hard and ligneous towards their centre. Miss Ormerod said that in the packing-case in which this specimen was received there was a great quantity of blackish sawdust, apparently from the injured outer covering, part of which still remained, and somewhat resembled rough brown paper. Mr. im-Thurn had expressed his fears that "the thin black crust" of the nest would suffer in transit. A large number of the *Termites* from this nest were exhibited, consisting of two apterous forms, but mostly "soldiers." The nest now exhibited was said to be a small specimen of its kind, as they were very frequently found of from six to eight feet in circumference. The other nest was of the general Termite nature, being of hard clay and showing the usual irregular chambers, but these particular ground-nests were stated to be very rarely, if ever, of large size.

Mr. F. P. Pascoe remarked that many years ago he had found a similar tree-nest in a forest in the Organ Mountains in Brazil, but did not at the time examine it; he learnt, however, that it was known there as the "negro-head," a name very suggestive of its appearance. The year before last he had met with a somewhat similar nest near Pará, but larger and of a lighter colour. They were both attached to trees, five or six feet from the ground, not to branches. The Pará nest was very friable, and on breaking into it scores of the "rostrate" workers rushed out (some of which, with portions of their nest, were exhibited). These workers have a very large head conically produced to a sharp point in front, the mouth underneath; and they are without eyes.

Mr. M'Lachlan regretted that no winged *Termes* had been exhibited or procured, since without the winged insects it was almost impossible to determine the species with certainty. The specimens obtained from the tree-nest, exhibited by Miss Ormerod, represented two forms of workers, *viz.*, the ordinary condition and a form occurring in many species of *Termitidæ*, known as nasute or horned workers ("Arbeiter nasuti"). It was a small species, and evidently allied to that exhibited by Mr. Pascoe, which was probably *Termes opacus*, Hagen. In Hagen's "Monographie der Termiten" (Linnæa Entomologica, vol. x.), much information was given in a collective form on the habits of these insects; further interesting observations are to be found in Dr. Fritz Müller's paper "Beiträge zur Kenntniss der Termiten," published in the 'Jenaische Zeitschrift für Medicin und Naturwissenschaft,' vol. vii., and in notes by Mr. H. G. Hubbard "On the Tree-nests of *Termites* in Jamaica" that appeared in the 'Proceedings of the Boston Society of Natural History,' vol. xix.

Mr. T. R. Billups exhibited a specimen of the rare *Ichneumon erythræus*, Gr., taken at Headley Lane, Surrey, in March last, remarking that the British Museum collection contained but two examples of this species. Also a specimen of *Lasiosomus enervis*, H.-Sch.,—a rare British Hemipteron,— which he captured at Weybridge on the 9th March last.

The Secretary announced the death of Herr J. H. C. Kawall, at the age of eighty-two, on the 29th January last, at Pussen, near Windau (Kurland, Russia), of which village he had been pastor fifty-one years. Kawall was a general entomologist, but especially studied the Hymenoptera.

Mr. R. M'Lachlan read the "Description of a new species of Corduliina (*Gomphomacromia fallax*) from Ecuador."

Mr. J. B. Bridgman communicated a paper entitled "Some additions to Mr. Marshall's Catalogue of British *Ichneumonidæ*," in which upwards of sixty species were introduced as new to the British fauna, thirteen being described as new to science. Mr. Billups and Mr. Fitch exhibited most of the specimens referred to.—E. A. Fitch, *Secretary*.

NOTICES OF NEW BOOKS.

An Introduction to the Study of Fishes. By ALBERT C. L. GÜNTHER, M.A., M.D., F.R.S., Keeper of the Zoological Department in the British Museum. 8vo, pp. 706, with numerous illustrations. Edinburgh: Black. 1880.

OF the many hundred volumes which have been published in English on Fish and Fishing, it is singular how very few treat of Ichthyology, in the strict sense of the term, that is to say, the internal and external structure of fishes; their mode of life, and their distribution in space and time. Some idea of the number of such treatises may be obtained by a glance at the catalogues of the literature of the subject which have from time to time appeared; notably Sir Henry Ellis's Catalogue published in the 'British Bibliography,' and reprinted (though without acknowledgment) in the Supplement to Daniel's 'Rural Sports,' Pickering's 'Bibliographia Piscatoria,' and the Catalogues of Messrs. Russell Smith (1856) and Westwood (1857). Incomplete as these are, they nevertheless serve to indicate the nature of the books on Fishes which have been put forth by English writers since the appearance of the earliest 'Treatyse of fysshynge wyth an angle,' in 1496. With but few exceptions, these works for the most part relate to the various methods and devices for capturing fish, with indications, more or less brief, of the situations in which they may be found. Now and again, in such works as those of Izaak Walton and Sir Humphrey Davy, we find some excellent remarks on the habits of fish, evidently written from personal observation; while the more scientific volumes of Yarrell and Couch furnish valuable materials for a natural history of the Fishes of the British Islands. But none of these writers have gone far enough; the limits of their respective works are too narrow; the reader gains from them no knowledge of the elements of Ichthyology, no idea of general classification, and is left in ignorance on many points of interest and importance, such as the internal structure, the organs of respiration, circulation, nutrition, and reproduction, the organs of sense, and the geographical distribution of fishes.

Thus, a work like that which Dr. Günther has now produced has long been a desideratum with zoologists. Its object, as defined by the author in his Preface, is "to give, in a concise form, an account of the principal facts relating to the structure, classification, and life-history of fishes; to meet the requirements of those who are desirous of studying the elements of Ichthyology; to serve as a work of reference to zoologists generally; and finally to supply those who, like travellers, have frequent opportunities of observing fishes, with a ready means of obtaining information."

Dealing first with the history and literature of Ichthyology, Dr. Günther passes in review the various naturalists of note who have written on the subject from the time of Aristotle down to the present day, and notices their principal works, and the system of classification proposed or adopted by each. The first chapter concludes with a useful catalogue of "Voyages containing general accounts of zoological collections," a list of Fish-faunas, and a list of works relating to the anatomy of Fishes.

In the list of Fish-faunas we observe that, under the head of "Great Britain," Dr. Günther has quoted only three writers on British Ichthyology, namely, Parnell (author of a 'Natural History of the Fishes of the Firth of Forth'), Yarrell, and Couch. We should have thought that he might also have added the names of Pennant, Fleming, and Jenyns, as systematic writers on British Fishes; while Thompson's 'Fishes of Ireland,' and the two volumes on British Fishes in Jardine's 'Naturalists' Library,' seem to us also worthy to be included in a list of faunal publications relating to Great Britain.

In Chapters II.—IV. we have a description of the external and internal structure of fishes, and succeeding chapters deal with their myology, neurology, and the various organs of sense, nutrition, respiration, circulation, and reproduction.

The author's remarks on the growth and variation of Fishes (Chap. XIII.) are very instructive. In young fishes, it seems, the eyes are constantly larger than in adult relatively to the size of the head; and again the head is large relatively to that of the body. Changes amounting to metamorphosis have been hitherto observed only in *Petromyzon*. One of the most extraordinary changes by which, during growth, the form and position of several important organs are effected, occurs in Flat-fishes (*Pleuronectidæ*). Their young are symmetrically formed, with a symmetrical mouth, and with one eye on each side; they therefore keep their body in a vertical position when swimming. As they grow they live more on the bottom, and their body, during rest, assumes a horizontal position; in consequence, the eye of the lower side moves towards the upper, which alone is coloured; and in many genera the mouth is twisted in the opposite direction, so that the bones, muscles, and teeth are much more developed on the blind side than on the coloured. In a great number of other *Teleostei* certain bones of the head show a very different form in the young state. The curious changes which the Sword-fish (*Histiophorus*) undergoes from the young to the adult condition are described (pp. 173—175), with illustrations.

The flesh of some fishes, says Dr. Günther, is at times, or constantly, poisonous. When eaten, it causes symptoms of more or less intense irritation of the stomach and intestines, inflammation of the mucous membranes, and not rarely death. All, or nearly all, these fishes acquire their poisonous properties from their food, which consists of poisonous *Medusæ*, Corals, or decomposing substances. Frequently, however, they are found to be eatable if the head and intestines be removed. In the West Indies, it has been ascertained that all the fishes living and feeding on certain coral banks are poisonous. In other fishes the poisonous properties are developed only at certain seasons of the year, especially at the season of propagation, as the Barbel, Pike, and Burbet, whose roe causes violent diarrhœa when eaten during the spawning season.

Poison organs are more common in the class of fishes than was formerly believed, but they seem to have exclusively the function of defence, and are not auxiliary in procuring food, as in venomous snakes. Such organs are found in the Sting-rays, the tail of which is armed with one or more powerful barbed spines. Although they lack a special organ secreting poison, or a canal in or on the spine by which the venomous fluid is conducted, the symptoms caused by a wound from the spine of a Sting-ray are such as cannot be accounted for merely by the mechanical laceration, the pain being intense, and the subsequent inflammation and swelling of the wounded part terminating not rarely in gangrene. The mucus secreted from the surface of the fish, and inoculated by the jagged spine, evidently possesses poisonous properties. This is also the case in many Scorpænoids, and in the Weaver (*Trachinus*), in which the dorsal and opercular spines have the same function as the caudal spines of the Sting rays; however, in the Weavers the spines are deeply grooved, the groove being charged with a fluid mucus.

Passing to the chapters which deal with the distribution of existing fishes over the earth's surface, we come to one of the most interesting portions of the work, and, from a scientific point of view, one of the most valuable.

In attempting to draw the line between marine and fresh-water species some difficulty is experienced, inasmuch as there are some which can gradually accommodate themselves to a sojourn in either salt or fresh water, and others which seem quite indifferent to a rapid change from one into the other; so that individuals of one and the same species may be found some distance out at sea, whilst others live in rivers far beyond the influence of the tide, or even in inland fresh waters without outlet to the sea.

Eliminating what may be termed the brackish water forms, Dr. Günther tabulates (pp. 208, 209) the true fresh-water fishes, of which he recognises 2269 species, and the marine fishes (pp. 255—311), which he divides into Shore Fishes, Pelagic Fishes (inhabiting the surface and uppermost strata of the open sea), and Deep-sea Fishes. Some idea of the vastness of the subject may be formed when it is stated that of the principal types of shore fishes alone, more than 3500 species may be enumerated.

To work out the geographical distribution of all these, as Dr. Günther has done, must have necessitated an expenditure of time and laborious research truly astonishing, and the result is the more to be valued, inasmuch as no previous writer on Ichthyology had attempted such extensive generalisations.

We should like to give some extracts from the chapter on Deep-sea Fishes (pp. 296—311), which is one of the most interesting in the whole volume, particularly as the knowledge of the existence of deep-sea fishes is, comparatively speaking, one of the recent discoveries of Ichthyology, for until the voyage of the 'Challenger' not more than thirty species were known. But the subject is one which cannot be discussed in a few lines, and we must therefore recommend our readers to peruse this chapter in its entirety. They will find in it a summary of the present state of knowledge respecting deep-sea fishes, and an interesting criticism of the results of the deep-sea dredging on board H.M.S. 'Challenger.'

The second half of Dr. Günther's work embodies what he terms "the Systematic and Descriptive Part," and comprises a general classification, with diagnoses of the orders, families, and principal genera; a brief indication of the number and geographical distribution of the species, with general remarks on peculiarities of form and habit, mode of capture, use and value in commerce, and so forth.

The numerous illustrations with which the text is interspersed, viewed in connection with the descriptions given, greatly facilitate the identification of the principal genera.

No group of fishes presents more difficulties to the ichthyologist, with regard to the distinction of the species and to certain points in their life-history, than the *Salmonidæ*, and an authoritative review of this family was much needed. We are glad to find that this is now supplied by Dr. Günther in the work before us (pp. 631—651), and clears up much of the confusion and misconception which has long existed concerning the *Salmonidæ*.

It is remarkable that no less than fifteen well-marked species of this family should be peculiar to the British Islands; yet such appears to be the case. The species in question are—

1. The Short-headed Salmon, *Salmo brachypoma*. Found in the Firth of Forth, the Tweed, and the Ouse.
2. The Galway Sea Trout, *S. gallivensis*. Galway and the West of Ireland.
3. The Loch Stennis Trout, *S. orcadensis*. Lakes of Orkney.
4. The Great Lake Trout, *S. ferox*. Larger lakes of Scotland, the North of England, and Wales.
5. The Gillaroo Trout, *S. stomachicus*. Lakes of Ireland.
6. The Black-finned Trout, *S. nigripennis*. Mountain lochs of Wales and Scotland.
7. The Loch Leven Trout, *S. levenensis*. Loch Leven, Loch Lomond, and Windermere.
8. The Welsh Char, *S. perisii*. Llanberis Lake, North Wales.
9. The Windermere Char, *S. Willughbii*. Windermere and other lakes in the North of England, and Loch Brinach, Scotland.
10. The Loch Killin Char, *S. killinensis*. Loch Killen, Inverness.

11. Cole's Char, *S. Colii.* Lough Eske, and Lough Dun, Ireland.
12. Gray's Char, *S. Grayi.* Lough Melvin, Leitrim, Ireland.
13. The Gwyniad, *Corregonus clupeoides.* Loch Lomond, Ulleswater, Haweswater, and Bala Lake, North Wales.
14. The Vendace, *C. vandesius.* Loch Mahen, Dumfriesshire.
15. The Pollan, *C. pollan.* Lough Neagh and Lough Earne, Ireland.

These fifteen peculiar fishes differ from each other and from all British and Continental species, not in colour only, but in such important structural characters as the form and size of the fins, the number of the fin-rays, and the form or proportions of the head, body, or tail. They are, in fact, as Dr. Günther points out, just as good and distinct species as any other recognised species of fish.

Did space permit, we should like to notice many other matters of much interest which are dwelt upon in the work before us: such, for instance, as the author's remarks on Sharks and Shark-fisheries (p. 315); on Electric Rays (p. 339); on the properties and affinities of that remarkable Australian fish, the "Barramunda" (*Ceratodus*), the survivor of an extremely ancient form, until recently believed to be extinct (p. 357); on Angler-fish (p. 470); on Flying-fish (pp. 481, 621); Whitebait (p. 658); and Eels (pp. 671, 672). On all these subjects the student of Ichthyology will find valuable information, and the general reader much to interest him. The directions for collecting and preserving fish with which the volume closes will be found of great utility not only to travellers abroad, for whose benefit they are chiefly designed, but to students at home, to whom the acquisition of fresh specimens is of the highest importance.

The natural history of fishes has never before been so fully and so ably dealt with as in the present admirable text-book, the publication of which may be said to mark a new era in the study of Ichthyology. On closing the volume, after a careful study of its contents, we have only one expression of regret to offer, namely, that the author has not given more references to important works and memoirs, wherein the student may find fuller details of the life-history of notable species than it has been possible to give in a work which purports to be only an "Introduction to the study of Fishes."

British Animals extinct within Historic Times: with some Account of British Wild White Cattle. By James Edmund Harting, F.L.S. With illustrations by Joseph Wolf and others. London: Trübner & Co. 1880.

It is a question which possesses most interest for naturalists, a study of the present or of the past? There is an indescribable charm in the exploration of pathless woods and lonely fens, of rugged mountain sides and smooth sandy shores, and in the contemplation of the varied forms of animal life to be met with in all these situations. On the other hand, there is a strange fascination in examining the relics of a bygone age, whether in the shape of exhumed remains of extinct animals, or ancient documents which tell of the former aspect and condition of the country; of the wild creatures which once inhabited it; and of the men who spent their lives in hunting them.

Certain it is that by a study of the past we are helped to an understanding of the present, and that study ought no more to be neglected in zoology than in the kindred sciences of geology and botany.

In the book before us an attempt is made to bridge over the gulf between past and present, and to supply a missing chapter in the history of British animals.

Five-and-thirty years ago Professor Owen, in his 'History of British Fossil Mammals and Birds,' made us acquainted with some strange forms of animal life whose existence on British soil in prehistoric times is incontestably proved by the discovery of their remains in various parts of the country: such, for example, as the Elephant, Rhinoceros, Hippopotamus, Hyæna, Cave Bear, and many others which can only be designated by the scientific names under which they have been described.

In Bell's 'British Quadrupeds,' of which a second edition was published in 1874, we have a history of such species as are still existing at the present time, and between these two works the volume before us aims at being the connecting link. It deals only with those animals which have become extinct in Britain within a period of which history takes cognisance. These are the Bear, the Beaver, the Reindeer, the Wild Boar, and the Wolf; and, by way of connecting the past still more closely with the present, a chapter is devoted to the history of the so-called Wild White Cattle which once roamed our ancient forests in company with the Wolf and the Boar, and whose descendants in a few scattered herds, scrupulously protected, are still to be seen in about half a dozen English and Scottish parks.

In most works treating of British animals some brief allusions to the former existence of the above-named species may be discovered, but the subject is usually dismissed in a very few lines, and in nearly every case with an erroneous indication of the date at which the animal became extinct in Britain. Thus, in the case of the Bear, almost every writer who has had occasion to refer to this animal has copied Pennant's statement to the effect that the last Bear was killed in Scotland in 1057 by a Gordon, who, in reward for his valour, was directed by the king to carry three Bears' heads on his banner. But, as pointed out in the work before us, this is altogether a fallacy. Reference to a copy of the original Latin MS., from which the translation quoted by Pennant was made (preserved in the Advocates' Library, Edinburgh), shows that, on the occasion referred to, the animal killed was a Boar, "*immanem aprum*," while the arms of the Gordon are Boars', not Bears', heads.

Numerous as are the Ursine remains which have been discovered at different times in various parts of the United Kingdom, there seems to be no reason for supposing that there were any Bears in this country at the date of the Conquest. Mr. Harting criticises the well-known quotations from Martial and Plutarch, relative to the transportation of Caledonian Bears to Rome, and calls attention to the fact of their being "direct testimony that the Bear was killed by the hand of man during the Roman occupation of Britain," although we observe that, in a recent notice of this work in 'The Saturday Review,' he is accused of having overlooked this important piece of evidence. He states nevertheless (pp. 12, 13), that in the collection of bones from the "refuse heaps" round Colchester, made by Dr. Bree, the remains of this animal were found along with those of the Badger, Wolf, Celtic Shorthorn, and Goat, and he adds that Professor Boyd Dawkins has also met with it in a similar "refuse heap" at Richmond, in Yorkshire, which is most probably of Roman origin. He adduces presumptive evidence, moreover, of the existence of Bears in Britain during the eighth and ninth centuries, after which period, so far as has been ascertained, history is silent on the subject.

With regard to the Beaver, as might be expected, reference is made to the account given by Giraldus Cambrensis of the existence of this animal in Wales in the 12th century, and Boethius is quoted with reference to its former occurrence in Scotland. It is not without interest to observe that in the enumeration of furs upon which duty was to be paid on exportation at Scotch ports in the reign of David I. (1124—1153), besides the common skins of tod (fox), whitret (stoat or ermine), mertrick (marten), and cat, mention is specially made in all the MSS. of the skins of *beavers* and sable, the latter being probably the polecat. Again, among the export duties licensed to be levied at Newcastle-on-Tyne in the time of Henry I. (1100—1135), we find the *tymbra·beveriorum* fixed at fourpence.

From the account given of the Reindeer (pp. 61—76), it appears that this animal was hunted in Caithness in the 12th century by the jarls of Orkney, who used to cross over to Caithness every summer for that purpose. But that the North of Scotland was not the only portion of the British islands which sheltered it, is proved by the numerous unmistakable horns and other remains of this animal which have been discovered in various other parts of Scotland, as well as in many scattered localities in England and Ireland.

The Wild Boar survived for many centuries later. It was hunted at Windsor by James the First, and its existence in Staffordshire, in the reign of Charles II., is proved by an entry in an old Household Book kept by the steward of Earl Ferrers at Chartley.

The Wolf, like the Bear, is an animal concerning whose extinction in Britain a popular fallacy exists. In almost any book on Natural History which we may take up, if there is any mention of wolves, one is almost certain to find the statement that the last Wolf was killed in Scotland by Sir Ewen Cameron of Lochiel, in 1680.

This statement, first put forth by Pennant in his 'British Zoology,' has been copied blindly by one writer after another to the present time. But it is now clear that it can have reference only to the particular district in which Sir Ewen Cameron lived, and not, as has been supposed, to the whole of Scotland.

"So far as can be now ascertained, it appears that the Wolf became extinct in England during the reign of Henry VII.; that it survived in Scotland until 1743; and that the last of these animals was killed in Ireland, according to Richardson, in 1770, or, according to Sir James Emerson Tennent, subsequently to 1766."

Various attempts have been made at different times to reintroduce some of these extinct animals, as, for instance, the Reindeer, the Wild Boar, and the Beaver, and particulars of these experiments are given in the book before us. In the case of the Reindeer it was a failure. Wild Boars would thrive well enough in many parts of the country were it not that public opinion and agricultural interests are alike opposed to their reintroduction.

Of the three animals named, the Beaver stands the best chance of again taking its place amongst the wild animals of Britain, although, of course, only in localities where large landowners could afford it protection over a sufficiently extensive area. From the interesting account which is given of the Marquis of Bute's Beavers by the head-keeper, who has carefully watched them since their introduction in 1874, it appears that they have not only thriven well, but have increased and multiplied. We have not space here to quote particulars, but must refer our readers to the book itself, in which sportsmen, as well as naturalists, will find much to interest them; for many an anecdote of Wild Boar and Wolf-hunting in the olden time, derived from ancient documents and records, has been rescued from oblivion, and some curious information is given respecting the former aspect of the country and the extensive forests with which it was covered at the period when the wild animals in question roamed here in freedom.

Engravings, by Messrs. Wolf and Charles Whymper, of each of the animals named are given at the head of each chapter, with woodcuts of their skulls and bones exhumed in different parts of the country, facsimiles of ancient carvings and sculptures, drawings on old MSS., and engravings from early treatises on hunting representing incidents in the chase of the animals in question.

The Natural History of the Cranes. A Monograph by the late EDWARD BLYTH. Enlarged and reprinted, with illustrations, by W. B. TEGETMEIER. 8vo. London: Horace Cox. 1881.

FEW ornithologists were better qualified to write authoritatively on the Cranes than the late Edward Blyth. A long sojourn in India gave him opportunities for observing many of the Asiatic species of *Grus* in a state of nature, while his position as Curator of the Asiatic Society's Museum at Calcutta not only placed him in direct communication with many good observers who could furnish him with reliable details of the habits of these birds (amongst others), but afforded him facilities for examining a good series of all or most of the species which he described. An extensive acquaintance, moreover, with ornithological literature enabled him to bring together the most reliable information bearing on the subject which had been published prior to the date of his monograph. This appeared in the Natural History columns of 'The Field' so long ago as 1873, and the numbers containing it having become scarce, Mr. Tegetmeier was induced to reprint it, with such additional information as had become available through books and papers subsequently published. An interval of seven years having elapsed, it is not surprising that these additions have proved numerous.

The writings of Col. Tickell, Messrs. Gurney, Hume, Coues, and other well-known ornithologists, have all been laid under contribution, the result being that a very complete account of the *Gruidæ*, or Crane family, is now before us in book form. Omitting the doubtful species, *Grus schlegelii* and *Grus fraterculus*, Blyth recognised fifteen species of Crane, namely, the well-known *Grus communis* of Europe and Asia; the Demoiselle and Stanley Cranes found in Europe, Asia, and Africa; the Wattled Crane and two species of Crowned Crane peculiar to Africa, but of which occasional stragglers have been met with in Europe; the Australian Crane, familiarly known as "the native companion"; the Whooping and Sandhill Cranes of North America; and half-a-dozen species which may be said to be confined to Asia, namely, *Grus leucauchen, leucogeranus, collaris, antigone, viridirostris,* and *monacha*.

Since the date of Blyth's publication another species has been added to the list, namely, the Black-necked Crane, *Grus nigricollis*, which was discovered by the Russian explorer, Colonel Prejevalski, at Koko-nor, in Mongolia (thought to be the northern limit of its distribution), and was described and figured in the second volume of his 'Birds of Mongolia,' which appeared in 1876. The coloured plate there given of this species has been faithfully reproduced in the monograph now before us, together with a translation of the discoverer's account of it.

Amongst the additions and corrections made by Mr. Tegetmeier to Blyth's original memoir, we notice some rectifications of synonymy. It appears that the proper scientific appellation of the Kaffir Crowned Crane is *Balearica chrysopelargus* of Lichtenstein, not *regulorum* as erroneously attributed to him by Bennett. Blyth described the White-naped Crane of Northern Asia under the name *Grus antigone*, Pallas, overlooking the fact that the name *antigone* was appropriated by Linnæus to the Greater Indian Crane of Edwards long before Pallas gave the same name to the White-naped Crane. This Mr. Tegetmeier has set right in the present volume, wherein he also points out that the *Grus torquata* of Blyth, following Vieillot, should be known as *Grus collaris* of Boddaert, this name having priority by more than half a century.

The utility of this monograph is enhanced by the plates with which it is illustrated, amongst which we particularly notice a full-page illustration of *Grus leucauchen*, in which the artist, Mr. T. W. Wood, has happily hit off the graceful attitude so characteristic of this group of birds, and two plates which contain figures of the heads of eight other species. Nor should we omit to notice the coloured frontispiece, from a sketch by Professor Flower, representing the curious appearance presented by a vast flock of Demoiselle Cranes, as observed by him in Egypt during the period of migration.

The thanks of ornithologists are due to Mr. Tegetmeier for having placed within their reach such an excellent edition of a valuable monograph.